



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



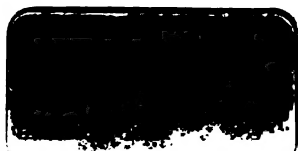
HARVARD UNIVERSITY



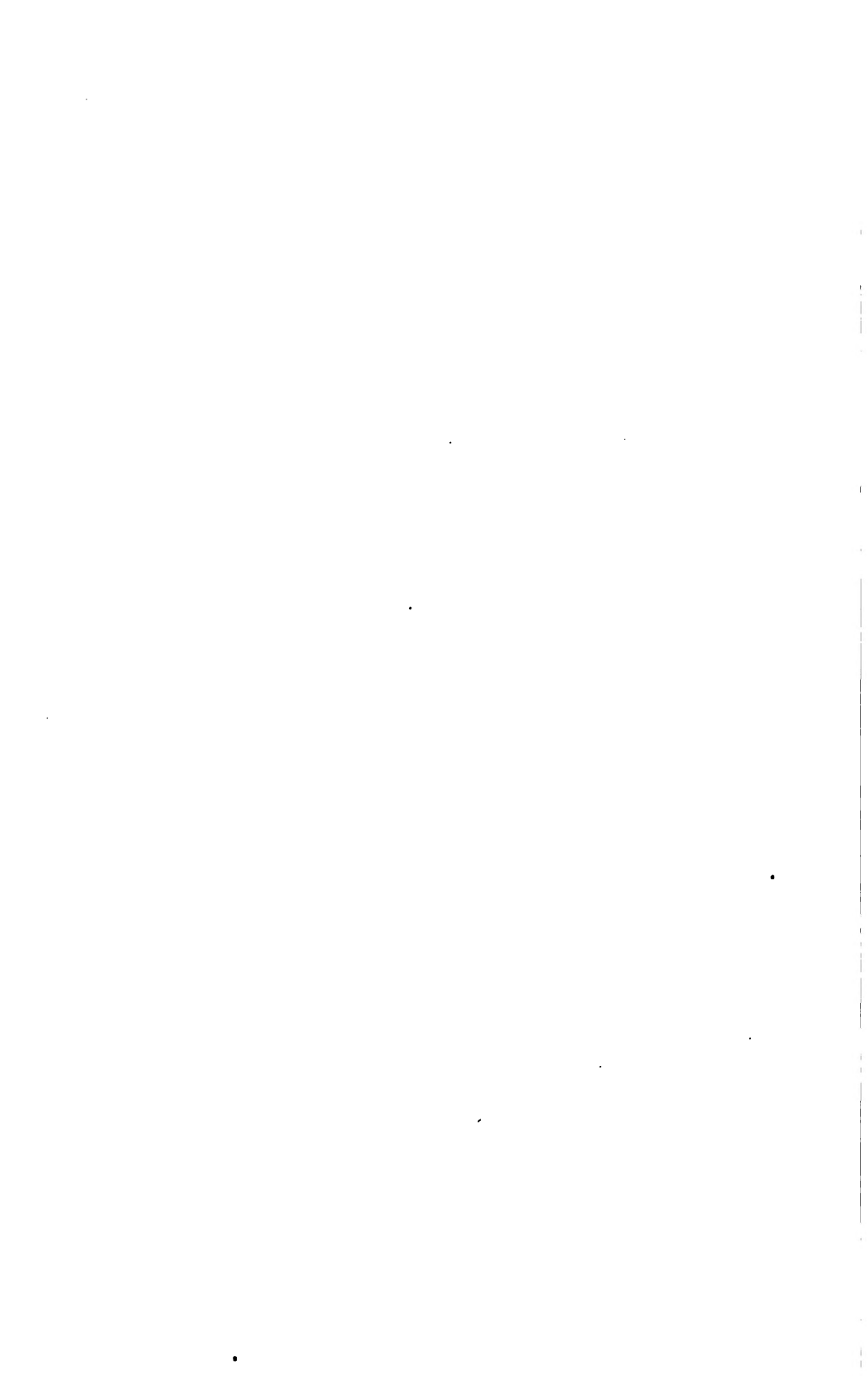
Library

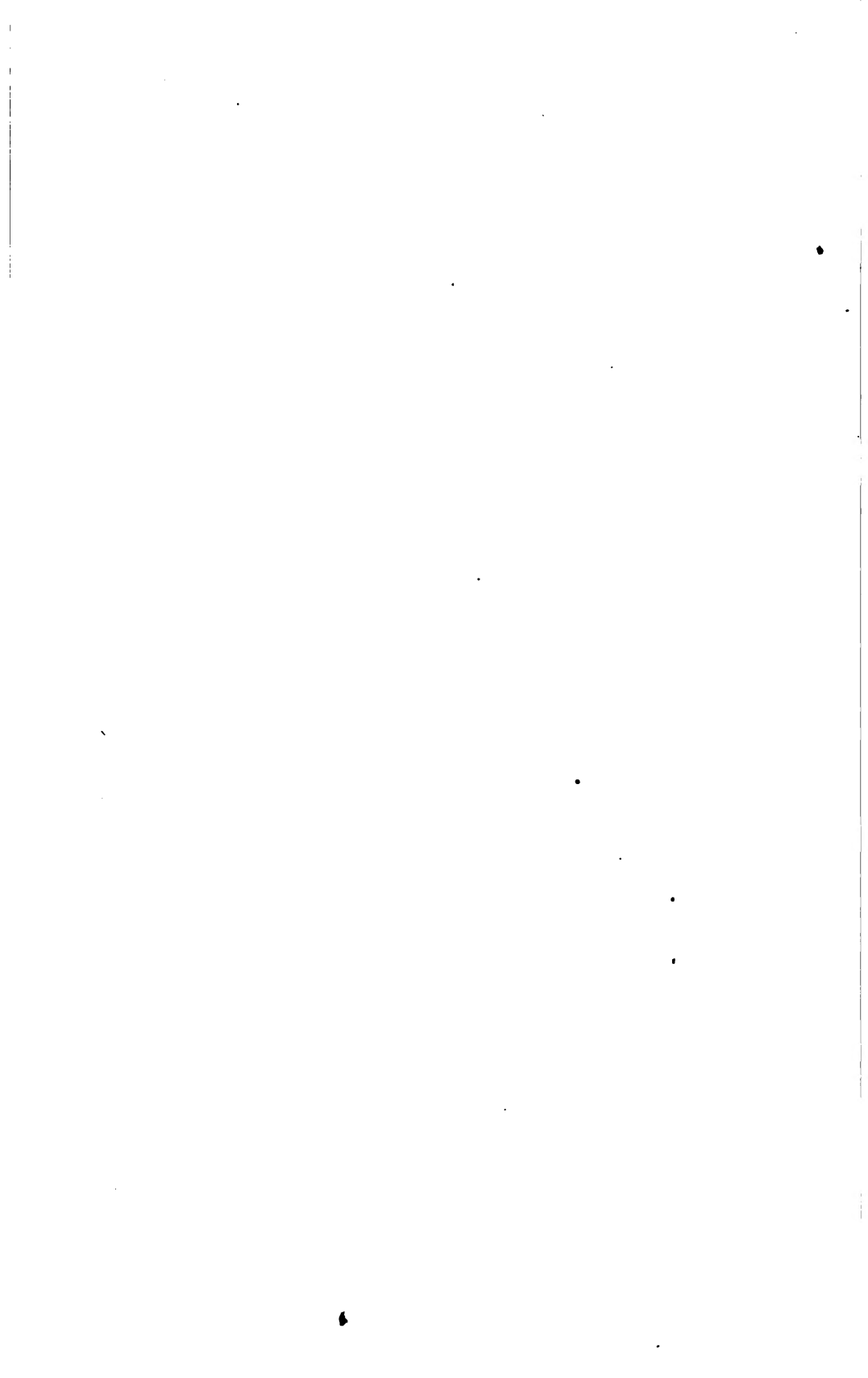
OF

The School of
Landscape Architecture

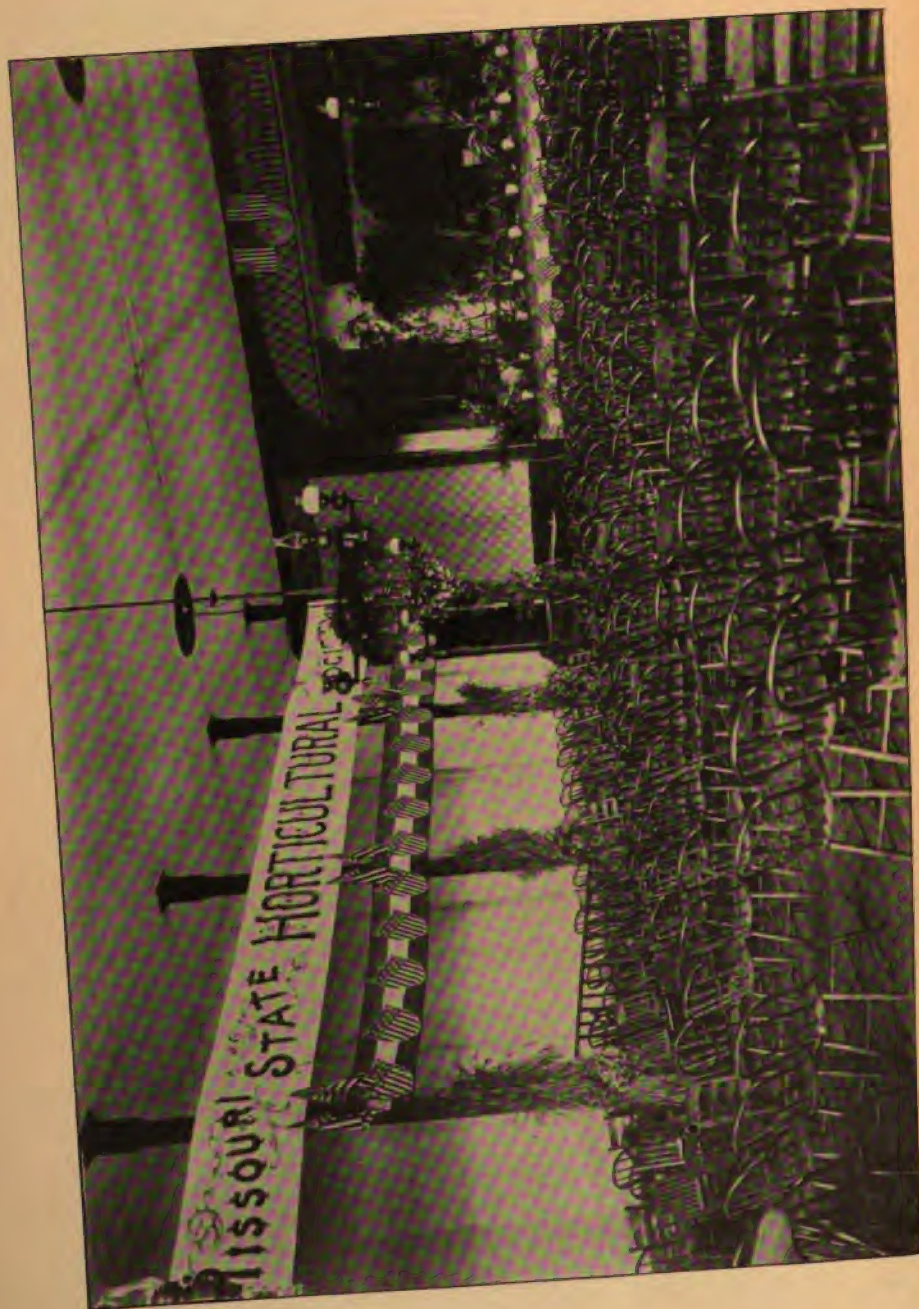












HALL DECORATION FOR THE MISSOURI STATE HORTICULTURAL SOCIETY, PIERCE CITY, MO.

FORTY-SECOND ANNUAL REPORT

OF THE

STATE HORTICULTURAL SOCIETY

OF MISSOURI—^

MEETINGS AT

Peirce City, June 6, 7, 8 and Princeton, December 5, 6, 7, 1899

L. A. GOODMAN, SECRETARY
WESTPORT, MISSOURI



JEFFERSON CITY, MISSOURI
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS
1900

7 Jan 1911
DEPARTMENT OF ARCHITECTURE,
HARVARD UNIVERSITY,

State Board of Horticulture
403

MISSOURI STATE HORTICULTURAL SOCIETY.

To His excellency, LON V. STEPHENS, Governor:

This report of our Society work, of the meetings held, of the moneys expended and of the local societies and counties reporting for the year 1899, is respectfully submitted.

L. A. GOODMAN, Secretary,
Westport, Mo.

City of Jefferson, December 12, 1899.

To the Commissioners of Public Printing:

I require for the use of my office Four Thousand copies of Missouri State Horticultural Society Report for 1899—Two Thousand to be bound in cloth and Two Thousand to be bound in paper—which I desire as per accompanying sample. Respectfully,

L. A. GOODMAN, Secretary,
Westport, Mo.

Approved:

A. A. LESUEUR, Secretary of State.
J. M. SEIBERT, State Auditor.
F. L. PITTS, State Treasurer.

OFFICERS FOR THE YEAR 1899 AND 1900.

Governor LON V. STEPHENS.....	Ex-Officio Member of Executive Committee
N. F. MURRAY, President.....	Oregon
D. A. ROBNETT, Vice-President.....	Columbia
SAMUEL MILLER, Second Vice-President.....	Bluffton
L. A. GOODMAN, Secretary.....	Westport
A. NELSON, Treasurer.....	Lebanon

LIST OF HONORARY LIFE MEMBERS.

R. H. JESSE, President State University.....	Columbia
HON. A. A. LESUEUR, Secretary of State.....	Jefferson City
J. C. EVANS	Harlem
MISS M. E. MURTFELDT	Kirkwood
GEORGE HUSSMAN	Napa, Cal.
T. T. LYON	South Haven, Mich.
C. W. MURTFELDT	Kirkwood
HON. N. J. COLMAN.....	St. Louis
SAMUEL MILLER	Bluffton
PROF. M. G. KERN.....	St. Louis
PROF. B. T. BUSH.....	Independence
PROF. B. T. GALLOWAY.....	Washington, D. C.
CONRAD HARTZELL	St Joseph
PROF. H. E. VAN DEMAN.....	Parksley, Va.
PROF. J. T. STINSON.....	Fayetteville, Ark.

LIST OF LIFE MEMBERS.

WM. MUIR, old member.....	Fox Creek
H. CLAGGETT, old member.....	Kansas City
J. C. EVANS	Harlem
L. A. GOODMAN	Westport
D. M. DUNLAP	Fulton
D. A. ROBNETT	Columbia
CHAS. HUBER	Seneca
C. H. EVANS	St. Louis
W. R. WILKINSON	Altenburg
H. M. WHITNER	Fredericktown
RIGHT REVEREND J. J. HOGAN.....	Kansas City

STANDING COMMITTEES.

Orchards.

D. A. ROBNETT, Columbia. W. E. LILLY, Chillicothe. J. E. MAY, Wilson.

Vineyards.

JACOB ROMMEL, Morrison. J. F. WILCOX, St. Joseph. J. T. SNODGRASS, West Plains.

Small Fruits.

G. W. HOPKINS, Springfield. G. A. STONE, Richmond. HENRY SCHNELL, Glasgow.

Stone Fruits.

W. A. GARDNER, Olden. J. P. CANADAY, Bogard. ARTHUR PATTERSON, Kirksville.

Vegetables.

C. M. WILLIAMS, Marcelline. J. P. SINNOCK, Moberly. J. K. SAUNDERS, Peirce City.

Flowers.

MRS. G. E. DUGAN, Sedalia. C. I. ROBORDS, Butler. N. O. BOOTH, Columbia.

Ornamentals.

PROF. H. C. IRISH, St. Louis. R. E. BAILEY, Fulton. H. S. WAYMAN, Alvord.

Entomology.

MISS M. E. MURTFELDT, Kirkwood. PROF. J. M. STEDMAN, Columbia.

Botany.

B. F. BUSH, Independence. GEO. R. RAUPP, Monett. T. B. CHANDLER, Farmington.

Nomenclature.

J. C. EVANS, Harlem. W. G. GANO, Parkville. K. B. WILKERSON, Mexico.

New Fruits.

SAMUEL MILLER, Bluffton. R. J. BAGBY, New Haven. A. H. GILKESON, Warrensburg.

Ornithology.

O. WIDMAN, Old Orchard. C. W. MURTFELDT, Kirkwood. C. HOWARD, Willow Springs.

Injurious Fungi.

PROF. J. C. WHITTEN, Columbia. DR. HERMAN VON SCHRENK, St. Louis.

Packing and Marketing Fruits.

F. H. SPEAKMAN, Neosho. H. E. MOSLEY, Olden. HENRY ADKINS, Sarcoxie.

Transportation.

G. T. TIPPIN, Nichols. C. C. BELL, Boonville. M. BUTTERFIELD, Lee's Summit.

Horticultural Education.

Chairman, G. B. LAMM, Sedalia. L. A. GOODMAN, Westport.

PROF. J. C. WHITTEN, Columbia.

MRS. G. E. DUGAN, Sedalia, MISS M. E. MURTFELDT, Kirkwood.

PROF. WM. TRELEASE, St. Louis. PROF. J. R. KIRK, Kirksville.

MISSOURI STATE HORTICULTURAL SOCIETY.

Organized January 5, 1859, at Jefferson City.

INCORPORATION AND REORGANIZATION OF THE HORTICULTURAL SOCIETY BY AN ACT OF THE GENERAL ASSEMBLY IN 1893.

The following law was passed by the Legislature incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi-annual meeting of the Society at Columbia, June 6, 7, 8, 1893, the act was adopted as part of the constitution of the society.

MEMBERSHIP.

Under the new constitution the law requires the payment of \$1 per year for membership fee. Life membership, \$10.

L. A. GOODMAN, Secretary.

ACT OF THE GENERAL ASSEMBLY.

The Missouri Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri Horticultural Society shall be composed of such persons as take an interest in the advancement of Horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri State Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an Executive Board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society. The Governor of the State shall be ex-officio a member of the Board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of the reports of the proceedings of the Board, Society and auxiliary societies as may, in the judgment of the State Printing Commission, be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than 400 pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

CONSTITUTION.

ARTICLE I. This association shall be known as the Missouri State Horticultural Society. Its object shall be the promotion of horticulture in all its branches.

ART. II. Any person may become a member of this Society upon the payment of one dollar and membership shall continue upon the payment of one dollar annually. Provided, however, that no person shall be allowed to vote on a question of a change of the constitution or the election of officers of this Society until after he has been a member for a period of one year preceding the time of election, except in case of a life member.

The payment of ten dollars at any one time shall constitute a person a life member and honorary members may be elected at any regular meeting of the Society; and any lady may become a member by giving her name to the Secretary.

ART. III. The officers of this Society shall consist of President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall be for one year, beginning on the first day of June following their election. The President, Vice-President and Treasurer shall be eligible to but one successive re-election.

ART. IV. The elective officers of this Society shall constitute an Executive Committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers in similar organizations.

ART. V. The regular meetings of this Society shall be held annually on the first Tuesdays in December and June, except when otherwise ordered by the Executive Committee. Special meetings of the Society may be called by the Executive Committee, and meetings of the committee by the President and Secretary.

ART. VI. As soon after each regular annual meeting as possible, the President shall appoint the following standing committees, and they shall be required to give a report in writing, under their respective heads, at the annual and semi-annual meetings of the Society, of what transpires during the year of interest to the Society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers, Ornamentals, Entomology, Ornithology, Botany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit and Transportation.

ART. VII. The Treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the President of this Society (forfeiture to be made to the Society), with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

ART. VIII. This constitution may be amended by a two-thirds vote of the members present at any regular meeting.

HOW TO ORGANIZE A HORTICULTURAL SOCIETY; ALSO THE CONSTITUTION FOR A LOCAL ORGANIZATION.

Anyone much interested on this subject of Horticulture can organize a society if he will speak to five or six different persons who are known to be prominent in this matter. Tell them that there ought to be a society in your county, and as it is such a good fruit country, ask them if they do not want to help organize one. You will hardly meet a refusal, but will be met with the remark "that they do not believe there is interest enough in your county to keep one up." Never mind this, but make an appointment to meet in some office in town on some Saturday. If you can get five to come together, organize and elect officers. Make the meetings regular each month and on the same Saturday. Some lawyer will let you have the use of his room to hold the meetings. Have the meeting in the best town in the county even if you have to go some distance to meet there. Talk this up until the next meeting, and let each one promise to bring another. Do not expect to have everyone belong, for they will not. Hold six winter meetings (November to April) in the city or village, and at the March or April meeting, select the places to hold the six summer meetings (May to October) at the homes of the members. Make this a picnic dinner, meeting about 10 o'clock, and after the dinner, hold the meeting and discussion; offer a few premiums for fruits and flowers, and have a general good time. Do not be afraid of a dollar or two, but use as much judgment in this matter as you would in any business of your own, and you will succeed. Talk to your neighbors about it if they are interested in fruit growing, if not, choose those who are so interested. They will not be much help to you if they are not fruit growers. Make out a program for the year, choosing one or two for an essay at each meeting. When the reports of the standing committees are made, have it done in writing, and have a report at every meeting. You can not expect to have everything work in complete order at first, and do not get discouraged if you find trouble at the start. Take your wives with you and have a good social time also. If I can be of use to you at any time, I will come and visit you if it is possible for me to get away. I will try and bring someone with me also to help along the good work.

L. A. GOODMAN,
State Secretary.

CONSTITUTION.

Article I. This association shall be known as ——— Horticultural Society.

Art. II. All persons interested in the subject of Horticulture may become members of this Society by signing the Constitution and paying annually to the treasurer the sum of one dollar: And provided further, that any person paying at one time the sum of ten dollars to the treasurer, may become a life member, and thereafter exempt from annual dues: Provided, further, that all ladies may become members by signing the Constitution without the payment of one dollar.

Art. III.—Section 1. The officers of this Society shall consist of a president, vice-president, secretary, treasurer and executive committee, consisting of five, of which the president and vice-president shall be ex-officio members.

Sec. 2. The president shall exercise a general superintendence of the affairs of the Society; preside at all meetings of the Society; appoint all committees unless otherwise provided; draw all orders on the treasurer as directed by the Society; call special meetings of the Society or executive committee when deemed necessary; he shall be ex-officio president of the executive committee.

Sec. 3. The vice-president shall assist the president, and in his absence perform his duties, and be ex-officio a member of the executive committee.

Sec. 4. The treasurer shall receive all moneys belonging to the Society; shall keep a just and true account of the same, from what source received, and pay out the same upon the order of the president, countersigned by the secretary. At the meeting of the Society on the ——— Saturday in December in each year (or oftener, if required by the executive committee), he shall make a full and complete report of all receipts and disbursements, and at the expiration of his term of office, turn over all books, papers, and all money or other property belonging to the Society, to successor in office. The treasurer, before entering on the discharge of the duties of his office, shall enter into a bond with sufficient security, to be approved by the president of the Society for its use, in the

sum of —, conditioned for the faithful performance of the duties required of him in this section.

Sec. 5 The secretary shall keep a full and complete minute of each meeting of the Society, and the proceedings of the executive committee. He shall receive and safely keep all books, periodicals, stationery, seeds, fruits and other like property of the Society subject to its order; shall correspond as may be necessary with all persons or societies as the welfare of the Society may demand. He shall report all the proceedings of the executive committee to the Society at its first meeting thereafter. He shall countersign all orders drawn upon the treasurer by the president under the direction of the Society, and have the care and custody of the seal of the Society.

Sec. 6. The executive committee shall assist and advise the officers in the discharge of their duties; prepare all premium lists; make all necessary arrangements for holding and conducting any and all such fairs as the Society may determine to hold, and such exhibitions of fruit as the Society may determine to make, and exercise a general supervision over the same, and generally to provide for the arrangements and business of the Society.

Art. IV. The officers of this Society shall be elected by ballot from among its members for the term of one year. The annual election shall be held at the regular meeting of the Society on the — Saturday in December, where the general business of the Society shall be transacted. Vacancies may be filled at any regular meeting of the Society.

Art. V. The regular meeting of this Society shall be held on the — Saturday of each month, at 1 o'clock p. m., at such places as the Society may select, at —: Provided, that the meetings in the months of May, June, July, August, September and October of each year may, by a vote of the Society, be held at the residence of any of the members outside of the city.

Art. VI. Executive committee may provide: First, for the payment of premiums to members of the Society for the best display of fruit, flowers or vegetables made at any regular meeting of the Society; second, for essays on any subject of interest to the Society, and arrangement of programme for the year; and third, for determining the places

for each meeting of the Society for the months of May to October, inclusive.

Art. VII. Five members of the Society shall constitute a quorum at any meeting, and three members of the executive committee shall be authorized to transact business at any meeting of the committee duly called. Special meetings of the Society or executive committee may be held by order of the president or any three of the committee on one week's notice to all members of the Society or board (as the case may be), given personally, or through the postoffice. Adjourned meetings may be held from time to time, as the Society may determine.

Art. VIII. The funds of this Society shall not be apportioned to any purpose without a vote of a majority of the members present at any regular meeting of the Society.

Art. IX. This Society shall have the following standing committees, which shall be appointed by the president at the January meeting in each year: Small fruits, stone fruits, orchards, vineyards, vegetables, flowers, ornamentals, entomology, botany, to each of which shall be referred all matters relating to those particular subjects. Each of said committees shall consist of one to three members.

Art. X. This Constitution may be amended by a two-thirds vote of all the members of the Society at any regular meeting: Provided, that notice of the intended amendment shall have been given at least one month prior to any action taken thereon.

Art. XI. The meetings of this Society shall be governed by the parliamentary rules usual for deliberative bodies.

LIST OF COUNTY SOCIETIES.

Adair County Horticultural Society—

R. M. Brasher, Pres't, Kirksville.

A. Patterson, Sec'y, Kirksville.

Atchison County Horticultural Society—

C. N. Coe, Pres't, Tarkio.

R. Lynn, Sec'y, Tarkio.

Audrain County Horticultural Society—

M. B. Guthrie, Pres't, Mexico.

K. B. Wilkerson, Vice-Pres't, Mexico.

R. A. Ramsey, Sec'y, Mexico.

W. G. Hutton, Ass't Sec'y, Mexico.

Wm. Eagan, Ass't Sec'y, Mexico.

W. M. Pearson, Treas., Mexico.

Barry County Horticultural Society—

W. W. Hitt, Pres't, Exeter.

G. G. James, Sec'y, Halley.

J. C. Crane, Treas., Exeter.

Barton County Horticultural Society—

C. Fink, Pres't, Lamar.

B. D. Hayes, Sec'y, Lamar.

Bates County Horticultural Society—

C. I. Roborda, Pres't, Butler.

J. B. Speer, Sec'y, Butler.

Birch Tree Fruit Growers' Ass'n, Shannon County—

Jas. Kirkendal, Pres't, Birch Tree.

F. Anderson, Sec'y, Birch Tree.

Bismarck Fruit Growers' Association—

C. J. Tullock, Pres't, Bismarck.

M. H. Dowling, Sec'y, Bismarck.

Boone County Horticultural Society—

D. A. Robnett, Pres't, Columbia.

Jos. Baumgartner, Sec'y, Columbia.

G. W. Burroughs, Treas., Columbia.

Buchanan County Horticultural Society—

J. H. Karnes, Pres't, St. Joseph.

F. McCoun, Sec'y, St. Joseph.

Butler County Horticultural Society—

D. C. Kitteridge, Pres't, Poplar Bluff.

E. R. Lentz, Sec'y, Poplar Bluff.

Butterfield Local—Barry County—

E. B. Utter, Pres't, Butterfield.

J. E. Utter, Sec'y, Butterfield.

Benton County, Ark., Horticultural Society—

C. J. Eld, Pres't, Bentonville.

J. C. Rucker, Vice-Pres't, Bentonville.

I. B. Lawton, Sec'y, Bentonville.

N. B. Cotton, Treas., Bentonville.

Callaway County Horticultural Society—

R. T. Murphy, Pres't, New Bloomfield.

R. E. Bailey, Sec'y, Fulton.

Camden County Horticultural Society—

J. W. Burhans, Pres't, Stoutland.

J. C. Evans, Sec'y, Stoutland.

Central Missouri Horticultural Association—

David Edwards, Pres't, Boonville.

F. J. Boller, 1st Vice-Pres't, Boonville.

Mrs. John Durr, 2d Vice-Pres't, Boonville.

C. C. Bell, Sec'y, Boonville.

W. A. Smiley, Treas., Boonville.

Christian County Horticultural Society—

M. King, Pres't, Billings.

R. C. Hendricks, Sec'y, Billings.

Clay County Horticultural Society—

F. M. Williams, Pres't, Barry.

Oliver Chedister, Sec'y, Linden.

Cole County Horticultural Society—

J. B. Brooks, Pres't, Jefferson City.

T. M. Barker, Vice-Pres't, Centertown.

A. J. Davis, Sec'y, Jefferson City.

F. M. Brown, Treas., Jefferson City.

Conway Horticultural Society, Laclede County—

W. H. Getty, Pres't, Conway.

R. O. Hardy, Sec'y, Conway.

Gentry County Horticultural Society—

W. A. Garrett, Pres't, Albany.

G. E. Adams, Sec'y, Darlington.

Wm. David, Treas., Albany.

Goodman Horticultural Society, McDonald County—

H. C. Blanchard, Pres't, Goodman.

E. H. Gurney, Sec'y, Goodman.

Green County Horticultural Society—

W. T. Zink, Pres't, Springfield.

A. W. Howell, Vice-Pres't, Springfield.

Miss Emma Park, Sec'y, Springfield.

H. H. Park, Treas., Springfield.

Henry County Horticultural Society—

M. L. Bonham, Pres't, Clinton.

H. C. Green, Vice-Pres't, Clinton.

J. M. Pretzinger, Sec'y, Clinton.

H. P. Burris, Treas., Clinton.

Holt County Horticultural Society—

N. F. Murray, Pres't, Oregon.

J. N. Menifce, Vice-Pres't, Oregon.

H. P. Blanchard, Sec'y and Treas., Oregon.

Jasper County Horticultural Society—

F. A. Hubbard, Pres't, Carthage.

Th. Betebenner, Vice-Pres't, Carthage.

Z. T. Russell, Sec'y, Carthage.

COUNTY SOCIETIES—Continued.

- Koshkonong Horticultural Society, Oregon County—**
 T. M. Culver, Pres't, Koshkonong.
 C. M. Alderson, Sec'y, Koshkonong.
 H. C. Huxley, Treas., Thayer.
- Laclede County Horticultural Society—**
 A. Nelson, Pres't, Lebanon.
 C. L. Palmer, Sec'y, Lebanon.
 D. R. Diffenderfer, Treas., Lebanon.
- Lafayette County Horticultural Society—**
 H. Turlenius, Pres't, Alma.
 G. H. Robius, Sec'y, Mayview.
- Lawrence County Horticultural Society—**
 W. T. Seward, Pres't, Marionville.
 B. Logan, Sec'y, Marionville.
 J. B. Logan, Treas., Marionville.
- Lincoln County Horticultural Society—**
 A. H. Kercheval, Pres't, Elsberry.
 B. C. Benedict, Sec'y, Moscow Mills.
- Linn County Horticultural Society—**
 A. P. Swan, Pres't, Marceline.
 H. D. Porter, Vice-Pres't, Marceline.
 Hiram Long, Sec'y, Marceline.
 I. W. Porter, Treas., Marceline.
- Livingston Horticultural Society—**
 G. A. Smith, Pres't, Chillicothe.
 J. T. Jackson, Sec'y, Chillicothe.
- Madison County Horticultural Society—**
 A. A. Blumer, Pres't, Fredericktown.
 H. M. Whitner, Sec'y, Fredericktown.
- Meramec Horticultural Ass'n, Crawford County—**
 E. R. Bowen, Pres't, Steelville.
 Peter Lovengood, Vice-Pres't, Steelville.
 Jos. Marsh, Sec'y, Steelville.
 K. D. Norval, Ass't Sec'y, Steelville.
 Chas. Lay, Treas., Steelville.
- Mercer County Horticultural Society—**
 J. F. Stanley, Pres't, Cainesville.
 H. S. Wayman, Sec'y, Alvord.
- Miller County Horticultural Society—**
 John Vetter, Pres't, Eldon.
 E. M. Sumptain, Vice-Pres't, Spring Garden.
 N. J. Shepherd, Sec'y, Eldon.
 J. R. Helfrich, Treas., Eldon.
- Missouri-Arkansas Horticultural Society—**
 D. S. Helvern, Pres't, Mammoth Springs, Ark.
 P. B. P. Hynson, Sec'y, Mammoth Springs, Ark.
- Missouri Valley Horticultural Society—**
 Homer Reed, Pres't, Kansas City.
 Clarence Holsinger, Vice-Pres't, Kansas City.
 C. A. Chandler, Sec'y, Argentine, Kan.
 G. F. Espenlaub, Treas., Rosedale, Kan.
- Monett Local—Barry County—**
 R. D. Creed, Pres't, Monett.
 Geo. Raupp, Sec'y, Monett.
- Montgomery County Horticultural Society—**
 F. K. Gutman, Pres't, Hugo.
 C. Hausser, Sec'y, Hugo.
- Mound City Horticultural Society—**
 D. B. Browning, Pres't, Mound City.
 J. M. Hasness, Sec'y, Mound City.
- Neosho Fruit Growers and Shippers Association (Newton County)—**
 T. P. Price, Pres't, Neosho.
 R. P. Liles, Vice-Pres't, Neosho.
 F. H. Speakman, Sec'y, Neosho.
 Scott Ferris, Treas., Neosho.
- Norwood Horticultural Society—**
 J. W. Hollenbeck, Pres't, Norwood.
 W. S. Calhoun, Sec'y, Norwood.
- Pettis County Fruit and Dairy Club—**
 Ed. Brown, Pres't, Sedalia.
 G. B. Lamm, Sec'y, Sedalia.
 J. H. Monsees, Treas., Beaman.
- Phelps County Horticultural Society—**
 Robert Merriwether, Pres't, Rolla.
 Albert Newman, Sec'y, Rolla.
- Pelrce City Fruit Growers' Association, Lawrence County—**
 J. K. Saunders, Pres't, Pelrce City.
 J. G. Morris, Vice-Pres't, Pelrce City.
 R. H. Edwards, Sec'y, Pelrce City.
 Geo. Raupp, Treas., Pelrce City.
- Polk County Horticultural and Agricultural Association—**
 G. W. Williams, Pres't, Humansville.
 C. M. Briggs, Sec'y, Humansville.
 A. H. Schofield, Treas., Humansville.
- Polk County (Ark.) Horticultural Society—**
 A. W. St. John, Pres't, Mena, Ark.
 D. H. Hopkins, Vice-Pres't, Dallas, Ark.
 F. S. Foster, Sec'y, Mena, Ark.
 G. S. Graham, Treas., Dallas, Ark.
- Pulaski County Horticultural Society—**
 A. W. Rausch, Sec'y, Richland.

State Horticultural Society.

COUNTY SOCIETIES—Continued.

Randolph County Horticultural Society—

B. B. Boucher, Pres't, Cairo.
G. N. Ratliff, Vice-Pres't, Moberly.
J. W. Dorsey, Treas., Moberly.
C. W. Halliburton, Sec'y, Moberly.

Ray County Horticultural Society—

A. Maitland, Pres't, Richmond.
G. A. Stone, Vice-Pres't, Richmond.
R. Williams, Sec'y, Richmond.

Republic Horticultural Society, Greene County—

W. O. Wade, Pres't, Republic.
W. E. Goodwin, Vice-Pres't, Republic.
T. B. Wallace, Sec'y and Treas., Republic.

Ripley County Horticultural Society—

J. G. Hancock, Pres't, Doniphan.
S. S. Hancock, Sec'y, Doniphan.

St. Francois Horticultural Society—

R. C. Tucker, Pres't, Farmington.
W. F. Hoey, Sec'y, Farmington.

St. Louis County Horticultural Society—

Henry Wallis, Pres't, Wellston.
H. C. Irish, Sec'y, St. Louis.
Chas. Kern, Treas., Ascalon.

Saline County Horticultural Society—

J. T. Stewart, Pres't, Blackburn.
Thos. Adams, Sec'y, Marshall.

Sarcoxis Gandy Fruit Growers' Ass'n—

J. M. Davidson, Pres't, Sarcoxie.
John Carnahan, Sec'y, Sarcoxie.
W. T. Burkholder, Cor. Sec'y, Sarcoxie.

Sarcoxis Horticultural Association—

J. C. Reynolds, Pres't, Sarcoxie.
John Johnson, Vice-Pres't, Sarcoxie.
J. B. Wild, Sec'y, Sarcoxie.
H. B. Boyd, Treas., Sarcoxie.
J. W. Haggard, Manager, Sarcoxie.

Seligman Local—Barry County—

G. W. Roler, Pres't, Seligman.
H. M. Foster, Sec'y, Seligman.

Shannon County Horticultural Society—

Jos. Holt, Sec'y, Montair.

South Mo. Fruit Growers' Ass'n, Howell County—

Geo. Comley, Pres't, Willow Springs.
J. Lovewell, Sec'y, Willow Springs.

South Mo. Hort. Ass'n, Howell County—

D. J. Nichols, Pres't, West Plains.
J. W. Hitt, Vice-Pres't, West Plains.
J. T. Snodgrass, Sec'y and Treas., West Plains.

Tri-County Horticultural Society—

J. H. Holloway, Pres't, Richland.
S. Kellar, Sec'y, Richland.

Union Horticultural Society—

E. S. Link, Pres't, Jefferson City.
D. A. Bobnett, Vice-Pres't, Columbia.
A. J. Davis, Sec'y, Jefferson City.

Vernon County Fruit Growers' Association—

J. D. Bowman, Pres't, Nevada.
J. Kennedy, Vice-Pres't, Nevada.
W. H. Litson, Jr., Sec'y, Nevada.
W. B. Smith, Treas., Nevada.

Washburn Local—Barry County—

H. J. Wood, Pres't, Washburn.
G. K. Hurd, Vice-Pres't, Washburn.
J. D. Berryhill, Sec'y, Washburn.
J. J. Hickman, Treas., Washburn.

Wayne County Horticultural Society—

W. C. Mulherin, Pres't, Chaona.
John Ware, Sec'y, Wappapello.
Jacob Fry, Treas., Wappapello.

Wright County Horticultural Society—

G. S. Killan, Pres't, Mt. Grove.
B. S. Snyder, Vice-Pres't, Mt. Grove.
Mrs. A. Z. Moore, Sec'y, Mt. Grove.
Mrs. C. Brooker, Treas., Mt. Grove.

SUMMER MEETING.

At Peirce City, June 6, 7, 8, 1899.

The Summer meeting of the Missouri State Horticultural Society was held at Peirce City on the above days, and it was one of the best Grand Old Missouri has ever had. The sessions were held in the opera house.

On the evening of the sixth, President N. F. Murray called the meeting to order. Horticulture and music are kindred professions and it was fitting that music should be first on the program. This was well rendered by Kreyer's orchestra. The opening prayer was delivered by Rev. J. E. Pershing.

The address of welcome was delivered by Joseph French, who in eloquent words opened the doors of Peirce City to the visitors and handed over the keys. The hospitality of her citizens is known beyond the State lines, and visitors felt all that Mr. French said.—The Southwest.

RESPONSE OF WELCOME.

"In response to the eloquent address of welcome by one of your worthy citizens, I, as the representative of the Missouri State Horticultural Society, desire to most heartily thank the officers and members of the Southwest Fruit Growers' Co-operative Union, not only for the invitation to hold our June meeting in your thrifty little city, but also for the interest you have taken in securing from the various railways the lowest rate we have ever had to one of our meetings, and to the good people of Peirce City we extend our thanks for your hospitality in throwing open your doors to the free entertainment of all who desire to accept. And again we thank not only the Co-operative Union but all the various committees and the citizens who have in any way contributed in making the necessary arrangements for our comfort and pleasure during our sojourn with you.

"Our society years ago adopted the missionary plan of holding meetings in different parts of the state with a desire and hope that we might

in this way awaken the people to a more lively interest in horticulture. And we are happy to say that in this we have not been disappointed. For proof of our success we call your attention to the proud position Missouri occupies as a fruit producing State. In quantity of fruit she is certainly third and destined in the near future to rank first. In size, color and quality she towers high above all others. In all the contests at the great expositions she has always carried off the highest prize. When it comes to the queen of all fruits, the luscious strawberry, your own highly favored section ranks first, not only in size, color and quality but also in quantity; as I am credibly informed no other section of Missouri, or of the world, ships so many car and train loads of strawberries as the section represented by your association.

"We meet with you to talk over and discuss the various topics pertaining to horticulture, to review the past, to speak of the present and to plan for the future. In the past we have made commendable progress and done much to develop the fruit industry of the State. At present we are in the deep, dark valley of disappointment. Never before in the history of the country has there been such a destruction of our fruit trees as was caused by the great Arctic wave that rolled over the entire fruit belt of the United States (save the Pacific coast) sweeping away our bright prospects and blasting our cherished hopes. Millions of young nursery trees have been killed, root and top. Tens of thousands of apple, pear, peach and other orchard trees have been entirely killed and many more are badly damaged. All the trees left growing in the nurseries will hardly be sufficient to replant those that have been killed in the orchards, and I doubt if five years of hard work will repair the damage and bring our orchards up to what they were prior to the cold wave of destruction.

"Many fruit growers have been led to say, like Jacob of old, 'All these things are against me.' And yet, with faith and trust in an overruling Providence and perseverance on our part, our disaster may all be turned to our future good. In the great cold wave many of our enemies went down; insects have been checked, weak varieties extinguished, to be replaced by those that are more hardy, and the old hobby horse—the cry of over-production—killed and buried so deep that we need not fear its resurrection for the next twenty years. A weary and disparing trav-

eler who found a single flower blooming in the wild desert over which he was passing cried out, 'I will not give up but struggle on, for God is here.' So, my horticultural friends, we need not give up for God is here—not a single flower, but in thousands of them, shedding their fragrance for our pleasure. And with all our losses let us remember that we have much left, for which we should be truly grateful. Let us take courage and push boldly forward in our work, remembering that if we are true and faithful to our trust then our present weary march through the deep valley with its overhanging clouds will only add enchanting beauty to the glorious view we shall have from the mountain top of success and final victory in the future."

Song.—Peirce City Male Quartette.

Recitation.—Miss Mona Coppock.

CULTIVATION OF FLOWERS.

Mrs. E. L. Parker, Peirce City, Mo.

I believe the cultivation of flowers was allotted to me. As for myself, I have no excuse to make; by the time I am through the trouble will be plain enough. But I feel sure the Horticultural Society here was not aware this would be my first effort in this line, since a girl of ten, when I wrote an essay on flowers. It commenced about like this, "There are many kinds of flowers," I have since learned there is a great deal in the cultivation to have any success with them. I am glad they have given me as much latitude as a Southwest Missouri preacher, if not from Genesis to Revelation. I can take from asters to zinnias and branch off on bulbs as a side issue.

But to begin. If you are really in earnest about raising some fine floral specimens, the best time to start is in the fall. Select some corner where you can have all the leaves and clippings from the yard wheeled, add any and everything that will decay; rotten chips and dirt from the woodpile, sand, a little ashes, the more soapsuds the better, all the coffee and tea grounds you can get, with a layer of earth every once and a while and when well rotted work it all over. By the time your seeds

need planting you will have loose, rich material for them to germinate in; it will need lots of water of course, but will never crust over the top or harden.

If you prepare your boxes or old pans right, nearly every seed will grow that has a live germ in it.

I have the best success with boxes about the size layer raisins come in, but like them a little shorter as they are more convenient to water. I bore two holes with a bit that is about the size of a lead pencil (if the holes are too large the water rushes in too fast) one or two inches from the bottom on each side and two or three in the bottom. Now go to the prepared heap for earth, fill them full, press that down well, sift through a piece of wire screen or old colander earth to refill it, press lightly and evenly this time, sow the seeds in rows to be able to distinguish the young plants from weeds, cover evenly as possible with sifted dirt, press down with a piece of pasteboard, place the box in a tub with enough tepid water in it to reach nearly to the top of the boxes, let them stay till moist all over the top; take out and place them so they can have good drainage. Put in (there I will have to let the secret out) your brooder if you have a combined incubator and brooder, if not make a bottomless box to fit the top of incubator with lid reaching across the top; be sure to fix it so air can get in. Let them stay till you can see their necks or shoots just ready to push through the earth, then take the box to a warm window every day, putting them back at night. If you have no incubator, a stovepipe shelf or back part of cook stove after the fire begins to die down is a great help in starting early plants. Always water by placing them in the water till the young plants are well above ground, and whatever artificial heat you give, be sure it is bottom heat. When the plants are up nicely I commence cultivating them by using a table fork and giving shower baths with a fine sprinkler or the hand, but still keep up a tub bath as often as necessary. I prefer to start most plants in boxes as they are so much easier protected from beating rains and too strong sunshine. Of course artificial heat is only needed for the early plants and those of us that can't have greenhouse have to tax our ingenuity to reach the much coveted end. I think if we have our own housework to do we had better try to select a few kinds

and do our best by them, though I always find it impossible to stick to that bit of advice. The few things I always try to have plenty of are nasturtiums, sweet-peas and pansies. I start a few nasturtiums in a little box, a cigar box does nicely; put them in thick as they are so easily transplanted and can be set out of doors as soon as frost is a thing of the past; but for the "main crop," I plant about the first of April, in the garden in good rich soil and cultivate just as beans. I read an article the other day that advised planting them in poor soil as the trouble with them they went too much to foliage. Don't you believe it. It is a fact if the soil is poor the foliage will be also, and so will the flowers. I buy an ounce of seed, plant two or three inches apart, that will make a long row. When they have grown to about four leaves, I commence taking up every other one to give to my friends. By the time they have been gone over once those left begin to crowd, so I go the rounds again. When they are thin enough I wait till they are in bloom, then in giving cut flowers away I advise changing the water every day or two and they will grow and bloom beautifully for weeks on the dining table by putting in the window between times where they can get the sun; and if you tire of them set them out in the ground.

I suppose you think, "Why do you get so many seed if you don't need the half?" Well, it is a satisfaction to give to your friends and then there are some you pity because they say they have no luck, when they should have said pluck.

The last of March or first of April I sow my sweet peas. Drill them along the furrow, not just stick one along every two or three inches, but thick, like garden peas, in good soil, out in full sunshine. I have better success with the rows running north and south. I think it is because the earth gets more air and sun. Have the rows far enough apart so they can be cultivated with a plow. You can in that way just revel in the sweet scented beauties, with a great deal less work than to have a few sickly things in a mound where they do not belong. I have a theory and intend to put it in practice this year at least. That is after they are all turned nicely up the wires, I will give them a good hoeing, plenty of water, then lay six inch boards along each side of the vines leaving space between of only a few inches for the vines and to pour water. There is so much tramping to admire and cut the flowers, the

ground gets packed so hard and then we unconsciously let the toes of our shoes bruise the vines. Of course the width of the boards is immaterial.

And pansies, I must say a word about them as they are a joy and beauty forever. I have told how I raise my plants; by the time they are large enough to set out, I have my bed ready for them spaded down deep of course. It must be like most all the rest of the flower garden, rich. I make my bed wide enough to hold five rows one foot apart so I can reach half way across from each side, and on a level with the rest of the ground, with a frame of boards (mine are fence boards) about two or three inches higher than the earth, so sash or any covering can be placed over them when freezing weather comes, and they will bloom most of the time through the winter.

When ready to set out I give the plants a good soaking and with a table fork—which I find to be one of the most useful tools for cultivating small plants—lift the plant and place in the little hollow prepared for it, fill the dirt in till the cavity is about half full, go over with water, finish filling with earth. In setting eighty plants this spring at one time in this way not one died or wilted. A cut worm got five, but I got the worm.

The crying need of most flowers seems to be water. Unless we are having frequent showers, I water my pansy beds every evening. Not just a little with a sprinkler, but take the nose off the can and pour it along the rows each way so it will reach the roots. By keeping the blooms cut and giving plenty of water, from a bed of fifty plants I cut over six hundred pansies in one day and could cut from two to four hundred any day for weeks, all nice blooms, none smaller than a twenty-five cent piece. And for those that live beyond the city waterworks as I do, would advise when they start that compost heap in the fall, to lay in a supply of sorghum molasses, for what small boy won't give a pansy bed or sweet pea rows a good soaking for a section of ginger bread for themselves and a bunch of blooms for their Sunday school teacher.

I have one pansy bed on the north end of the house that requires but very little more water than the rains give it.

I would like to ask one question, that is, where to set my chrysanthemum that has budded to bloom, this June 6? I never had one in bloom till fall before and don't know whether to put it in partial shade

or noonday sun. I also have a tuberose ready to burst into bloom. I thought it best to have them in the hall to-night, as when the ground was covered with snow and sleet this spring, I told a gentleman I had cabbage plants up two leaves above the ground (had only sown the seed forty-eight hours before.) He looked at me and said, "I thought the fishing parties were all out of town."

After hearing the paper read Secretary Goodman highly complimented the paper and said there were more good practical facts in it than any he ever heard read before the society on this subject. He wished to add cosmos to the list of flowers usually grown. It is a late bloomer, great bunches of flowers can be cut after most of flowers have got through blooming. Plant in rows same as sweet peas and plow them.

Vocal Solo.—Miss Bessie Saunders.

THE MISSOURI BOTANICAL GARDEN AND WHAT IT IS DOING FOR HORTICULTURE.

By H. C. Irish, Missouri Botanical Garden, St. Louis, Mo.

The founder of the Missouri Botanical Garden, Mr. Henry Shaw, having amassed a comparatively large fortune, decided, when at the age of thirty-five to retire from active business and devote the rest of his life to the pleasures of a garden. He had come into possession of several hundred acres of land situated at that time about four miles from St. Louis. Upon this estate he built a home and began a plan of improving and beautifying a few acres for his own satisfaction and pleasure. As the grounds developed and grew in attractiveness the public began to take so much interest in the place that about 1858, Mr. Shaw concluded to convert them into a scientific institution. Accordingly for their further development he followed a plan with this in view and very materially increased the variety of plants and arranged them not only in an artistic manner, but in such a way that the plants themselves could be most effectually exhibited. About the same time he secured from the State Legislature an act enabling him to place the Garden, either during

his lifetime or by will under the management of a board of trustees. From this time the garden made a systematic and steady advancement under the personal supervision of the founder to the time of his death in 1889.

About 1866, Mr. Shaw created the idea of establishing a park adjacent to the garden, and accordingly deeded to the city, on condition that a certain sum of money should be given annually for its improvement and maintenance, a tract of about 285 acres, or what is now Tower Grove Park. Again, about 1883, Mr. Shaw conceived the idea of establishing a school of botany as a department of Washington University "which should stand in such relation with the largely endowed Missouri Botanical Garden and Arboretum as would practically secure their best uses for scientific study and investigation to the professors and students of the said school of botany for all time to come." This idea took definite shape some two years later when in accepting Mr. Shaw's proposal the trustees of Washington University established the Shaw School of Botany and received from Mr. Shaw a deed of improved real estate, the income from which is used to meet the expenses of the said school.

Mr. Shaw left most of his estate, appraised at about a million and a third dollars as an endowment of the garden, consisting mostly in real estate. Some in the business portion of the city yields a large revenue but most of it is situated in the vicinity of the garden and yields no income. The trustees named in Mr. Shaw's will consists of fifteen members, ten of whom are designated by name, while the remaining five are ex-officio members, namely: Mayor of St. Louis, the Bishop of the Episcopal Diocese of Missouri, the president of the Academy of Science, the President of the Public School Board, and the Chancellor of Washington University of St. Louis. Vacancies are filled by the remaining members, and all perform their duties without compensation.

The garden proper contains about forty-five acres divided into sixteen for the more especially decorative portion, twenty for the arboretum, six for the fruiticetum, and three for the vegetable garden. There are approximately eighty acres of meadow land next to the garden which it is hoped will be added to the present area, twenty acres to be planted to a representative collection of North American plants hardy at St.

Louis, arranged in botanical sequence and with decorative effects the balance to be afterward planted to a general flora of the world and arranged in the same manner. The present arboretum contains a small representation of hardy deciduous trees, also a collection of wild herbaceous plants grouped in families; a bog, ponds, and a rockery which are occupied with plants suited to these varied conditions. The fruiticetum contains a collection of our leading fruits most of which have been planted during the last four years, these grounds having been undergoing a complete renovation during this period, hence only a few of the tree fruits are now in bearing. At present there are about thirty-five varieties of apples, twenty pears, twelve peaches, ten plums, eight cherries, four quince, twenty-four grapes, ten blackberries, eight raspberries, eight gooseberries, nine currants and fifty strawberries. Space will not admit a large collection of tree fruits and there are only two or three specimens of each variety, while there is a greater number of small fruits and the collection is constantly being enlarged. Here are also grown many vegetables, especially for experimental purposes. In the vegetable garden proper is grown a general collection of culinary vegetables sufficient to keep a large family in constant supply the entire season. Here are also forcing houses which give a constant supply of vegetables during the winter months and two grape houses in which two of the leading European varieties of grapes not hardy here, are grown. The main part of the garden is laid out for the most part in a formal manner bounded by high stone walls and marked by many geometrical walks along which are arranged groups of plants for study and decorative effects. Many of the tender exotic plants from the greenhouses are distributed over this area during the summer season. A space is given to what is called "Grandmother's Garden," or a collection of many of the hardy old fashioned plants; in another part is situated a number of ponds in which many rare water plants are grown, and several rockeries on which quite a large collection of alpine plants are arranged. There are seventeen plant houses exclusive of the vegetable forcing houses, having approximately 17,000 square feet of glass together with a large number of frames and hotbeds. Two of the houses are devoted mostly to palms, two to economics, two to orchids, one to ferns and cycads, one

to cacti and the others to miscellaneous collections. An inventory taken last year showed more than 8,000 varieties and species of plants growing at the garden in 1898.

The library contains about 33,000 books and pamphlets of which probably more than 3,000 belong to the more purely horticultural part. All are card catalogued as well as systematically arranged on the shelves. In addition there are more than 240,000 index cards referring to the printed literature on a great variety of horticultural and botanical subjects. The herbarium contains about 300,000 sheets of dried plants.

The course of instruction for garden pupils covers a period of four years and provides, in the first place for six scholarship students who are granted a cash allowance of \$200 each for the first year, \$250 the second year and \$300 for each succeeding year; and further provision is made for the admission of students, either young men or young women, to the regular course upon the payment to the garden of a tuition fee of \$25 per year, said students being entitled to the same privileges and certificates as the scholarship students. One of the six scholarship positions is filled by the nominee of the Missouri State Horticultural Society, one by the St. Louis Florists' Club and the remaining four by competitive examination. All candidates must be young men between the ages of fourteen and twenty years, of good character and possessing at least a good elementary English education and whenever the number of applicants exceeds the number of scholarships to be awarded the candidates are examined in some of the higher branches, English literature, algebra, German, the elements of botany, zoology and physiology. The prescribed course of study requires of each student from nine to ten hours manual work each day, according to the season, for the first year and during the last three years five hours per day in general gardening operations. The student is periodically transferred from one department to another and to more responsible tasks according to merit. They thus become familiar with all branches of the work. The balance of their time or one half day during three years is given to theoretical instruction—lectures, courses of reading, field observations, etc., all of which is practically tested so far as possible in the field, laboratories, or greenhouses. The course covers 924 exercises for each student divided among the different branches as follows: floriculture 96, vegetable

gardening 48, fruit culture 96, forestry 36, landscape gardening 36, surveying and drainage 72, bookkeeping 48, economic entomology 60, general botany 96, botany of decorative plants 60, botany of hardy woody plants 36, botany of fruits 24, botany of vegetables 12, botany of weeds 12, economic mycology 24, vegetable physiology 48, geographical botany 12, special thesis work 12. The general botany, economic mycology, and vegetable physiology are regular courses offered at the school of botany, tuition free for Garden pupils, the other branches being taught at the garden. In the floricultural work is given the methods of greenhouse construction, heating, and ventilating, the propagation, care, and culture of the various decorative plants; vegetable gardening comprises the special care and culture of the various culinary vegetables and fruit culture the nursery and orchard management of all fruit plants; forestry covers the various methods of propagating forest trees, the uses for which each is especially adapted, the planting and management of forests in general and their effects on climate; landscape includes the construction of roads and walks, the methods of planting, grading, arrangement of plants, and a study of the principles involved; surveying and drainage are given to the extent of enabling the student to lay out roads and walks and locate objects in a given area together with leveling, the principles and practice of tile drainage and the use of engineering instruments; bookkeeping to the extent of enabling one to keep a systematic, intelligent, and accurate account of a moderately large business establishment; entomology to the extent of enabling a student to classify insects, familiarizing him with the habits and life history of the more important economic groups and to apply remedies and preventatives; economic mycology embraces the classification and life history of fungi, algae and lichens, but especial reference is given to fungus diseases and the application of preventatives and remedies; vegetable physiology embraces a study of the functions of plant organs, the roots, stems, leaves, conduction of sap, respiration, etc. Special theses work comprises an exhaustive study of some selected subject which the student may be especially desirous of investigating.

Nineteen pupils have been admitted to the scholarship course since its inauguration in 1890, six of which are now pursuing their studies. Six of the others left before completing the course, two leaving to accept

positions. One of them has since finished the work and with the remaining seven has been granted a certificate of graduation. All graduates either accepted positions at some horticultural work or continued their studies in other institutions, three entering as gardeners or florists at as many different colleges, one continued his studies at the Arnold Arboretum near Boston and later at the famous Kew Gardens near London, and is now employed by one of the leading landscape firms in the United States. Two were called to metropolitan park service and one as private gardener to a citizen of St. Louis, while one continues work as a garden employee. Two have since chosen other lines of work, thus leaving six who are now in responsible positions carrying on efficient work in horticultural lines. Four students have been admitted to the course on the tuition plan, three of them afterwards entering as scholarship students, one being a young lady and not entitled to the scholarship grants.

The course is arranged primarily for the purpose of training young men to become practical gardeners rather than professional scientists. It is not possible, however, for a student in the allotted time of four years to become a specialist in any line and at the same time familiar with all branches. The aim is to teach a student the principles and actual practice of budding, grafting, propagating or other garden operations with as large a variety of the most important plants as possible, rather than to enable him to become especially proficient in any one branch.

In addition to the opportunities for Garden pupils any horticulturist or botanist or anyone interested in any phase of horticulture or botany may, at any time have free use of the facilities the Garden has for advanced study. Many have taken advantage of these opportunities and have there given more or less time to original research and experimental work.

To further encourage horticultural work Mr. Shaw provided for the awarding of premiums at flower shows to the amount of \$500.00 per year. These premiums are awarded at the annual Chrysanthemum Exhibition of the St. Louis Florists' Club. Annual banquets are given to invited florists, nurserymen, and market gardeners, that they may become better acquainted as well as discuss topics of common interest. Provision is also made for the preaching of an annual floral sermon "on the

wisdom and goodness of God as shown in the growth of fruits, flowers, and other products of the vegetable kingdom." An annual volume is published which contains a general report of the Garden operations together with a few scientific and other papers and is sent to various educational institutions and scientific organizations in all parts of the world. A large number of papers have been written for other publications by employees of the Garden and others based chiefly on work done by aid of the facilities of the Garden.

Having thus outlined the work of the Garden, its equipment, and the results attained, it is only necessary in conclusion to refer to another feature which is no less important, namely, the visiting public. From actual count of visitors passing through the gates each day during the last few months it is estimated that from 80,000 to 100,000 people visit the place each year. Surely the work is appreciated and the influence far reaching.

SECOND SESSION—Wednesday, June 7.

STRAWBERRIES.

The meeting was called to order at 9:30 in the morning by President Murray. Prayer was offered by Rev. W. N. Porter. The president appointed the following committees:

COMMITTEES.

FRUITS:—

J. C. Evans,
J. T. Stinson,
F. H. Speakman.

FLOWERS:—

J. C. Whitten,
J. M. Irvine,
Mrs. E. L. Parker.

FINANCE:—

J. T. Snodgrass,
G. T. Tippin,
R. J. Bagby.

OBITUARY:—

C. I. Robords,
J. H. Monsees,
J. Hensley.

FINAL RESOLUTIONS:—

Levi Chubbuck,
Frank Atwood,
W. H. Barnes.

CANNED GOODS:—

G. A. Atwood,
Mrs. A. Nelson,
Miss A. Murtfeldt.

Among the visitors present were: Col. W. G. Vincenheller, ex-Commissioner of Agriculture and for several years president of the Arkansas State Horticultural Society, who came up from Fayetteville, also Prof. J. T. Stinson, the able gentleman in charge of the Horticultural Department of the Arkansas Experiment Station. From Bentonville, the apple center, came Judge I. B. Lawton, secretary of the Benton County Horticultural Society; Maj. Geo. Bill, a veteran of the Mexican war, and a veteran fruit grower; and C. J. Eld, president of the Benton county society. From Mammoth Spring were D. S. Helvern, his wife and sister. Mr. Wm. H. Barnes, secretary of the Kansas Horticultural Society, was with us again, and Mr. Fowler, of Waterloo, Iowa.

VARIETIES OF STRAWBERRIES FOR MARKET.

By W. F. Rausch, Monett, Mo.

The question of varieties must be settled by each berry growing locality, since one variety may be the best in one place and no value

in another. For this southwestern Missouri the following are about as good as any or the best we have: Warfield is in the lead, but Bubach has made more money the past season and done better than anything else on the place. Warfield and Bubach are the best imperfect bloomers we have and we can not well do without them.

Now, I wish to say that Tennessee Prolific and Clyde planted with Warfield will perfectly fertilize them. Phillips' Seedling is a splendid pollenizer for Bubach and will pick right with them. All the above are large to very large and will go on any market and hold their own.

For late, Gandy and Aroma are the market berries. Gandy is better known than Aroma, but the Aroma is the better of the two. It is a fancy berry, none prettier, very large, much more productive than Gandy and ripens about a day or two earlier.

The berries I mention in this list are the most profitable ones I have had the pleasure of testing, and I believe they do well over a wide range of country.

Mr. L. A. Goodman, Westport:

Dear Sir.—Yours received requesting my paper on strawberries. There has been so much said and written on the strawberry, I think it useless for me to write or say anything. Should I have to write or say a word it will be on the same lines I have been advocating ever since the summer meeting at Springfield, 1887, that is, fewer acres and thinner or fewer vines, higher cultivation, best varieties, and only large, perfect berries.

Respectfully,

G. G. JAMES,
Exeter, Mo.

QUALITY IN PREFERENCE TO QUANTITY.

By Geo. Raupp, Monett, Mo.

Mr. President:—

In presenting the subject "Quality in Preference to Quantity," I do not wish to be understood that I object to quantity provided quality is observed. In all our speculations and business enterprises, the principal object is the profit there is in it. If you can satisfy the buyer or

consumer with your products for highest prices with least labor and expense, you have gained the object. To obtain best results in profits, economy is essential with the producer as well as with the buyer or consumer, for the enormous waste resulting from neglect of quality is a loss to both.

It is generally cheaper in the long run to pay full value for a first class article, than to pay half price for inferior trash you can not use to advantage.

In addition to supply and demand, the value of every article of commodity in the commercial world is rated in accordance with its quality; even gold is rated higher than silver in the political world. (Excuse me if I hinted politics in a horticultural meeting.)

There is a limit to quantity but there is no limit to quality. Notice reports and quotations from commission men on strawberries the present season. The other day, fifty car loads at Chicago in one day! Some of them did not pay freight and refrigeration while fancy berries were wanted and sold at \$2.00 per crate. I want to relate a circumstance that occurred here at Peirce City about twenty-five years ago. I was sitting in front of Mr. Smith's grocery store one day talking with him, when a man drove up and said: "Smith, let me sell you some peaches." Smith looked at the peaches and said: "I don't want them." The man offered them at 10 cents per bushel, rather than to haul them back home. Smith declined to buy them at any price. About twenty minutes later, another man drove up and said: "Smith, let me sell you some peaches." Smith looked at them and asked: "What do you want for them?" "A dollar a bushel," was the answer. "All right, I'll take them," said Smith. Well, you can imagine the difference between the peaches. The first lot was a wagon load of little, hard seedlings, shook from the trees. The second lot contained about five bushels of as fine peaches as I ever saw. Big as the other fellow's (small) pumpkins.

This transaction was significant to me regarding quality and quantity. Last year, I sold all my grapes at 25 cents per 8 pound basket from about an acre and did not have enough to supply the demand, while at the same time I saw grapes in big boxes, tubs, slop buckets (where they belonged) selling at one cent per pound and they were dear at that.

Is it not a fact that some farmers and horticulturists (?) still persist in shaking apples off and what they can't shake off, knock off with a pole, to take to market?

Is it not true that a great many have thought the more plants in the row the more berries?

The same mistake is made in letting trees overbear with a hope of getting quantity. I made the same mistake with a few grape vines I let overbear. The grapes wilted, couldn't mature, were worthless and the vines got awfully sick and are sick yet. But I want to hit still a little closer in support of my proposition that quality is of first consideration. Berry growers all over the country are now agitating and discussing the question of limitation of acreage in order to reduce quantity and produce better quality.

Four years ago, strawberry patches in this section (except Sarcoxie) were few and small. The season was favorable. Some growers blowed their horn of having made at the rate of one thousand dollars per acre. Strawberry fever set in. A great many planted strawberries that knew nothing about the business, except perhaps what they learned from catalogues by men who wanted to sell plants. Some reasoned(?): That beats corn. I'll just put out sixty acres of strawberries and make \$60,000.

Van Buren, Ark., boasted of 3,000 acres of strawberries. Rumor has it that the large acreage "busted" some of the growers. Some people have too much land anyway.

It is rather a risky move for any one to invest all his savings and a year's labor in a specialty, a product perhaps little understood, under a fever of producing larger quantities regardless of quality, a thing, most perishable, that won't wait on you forty-eight hours until it goes back to water—only changing form. Anything you can store away and keep in good condition (hold its quality) until the market suits you, is much safer, especially in large quantities. The appearance or looks, such as size, color, firmness, ripeness, etc., is of more importance than certain flavors. Tastes differ. I have seen people using sugar on salad. The popular taste adapts itself to something pretty and lots of it. Ben Davis is a good example on this point. Where a mistake has been made in planting undesirable varieties, for instance, quality good

enough but unproductive, or productive but unsalable, or other drawbacks to make them unprofitable, the only remedy I can suggest is to either cut down and replant or resort to grafting. As a general rule, the kind best adapted to your soil and climate is the most profitable quality.

Permit me to call your attention to the report of the Monett Horticultural Association on returns of last year: The association inspected and graded.

Average (A) Fancy.....	\$1.26 1-6
Average (B) Choice.....	1.03 1-4
Average (C) Common54
General average.....	1.08 1-3

These figures are per crate net from the commission merchant after deducting freight, refrigeration and commission. We calculate about fifty cents expense for crate material, picking and other incidentals. Deduct that amount from A grade, leaves 76 1-6 cents per crate. Deduct same amount from C grade and you have 4 cents per crate for your fun of growing them. According to these figures it would take nineteen car loads of common to equal one car of fancy. No; I have got that wrong. It takes twenty cents per crate to grow them ready for picking. You are short sixteen cents, and the more you'd ship of this quality, the more you'd be "out."

It took as much labor, it cost the same freight and refrigeration on these C grade berries as on the A grade, besides the A grade would have brought more than they did had we saved our sixteen cents.

Allow me to say in conclusion that if those about to engage in the business of horticulture will qualify themselves by aid of such meetings as this, by aid of horticultural schools, by aid of such journals as the Southwest and by aid of home associations, prepare for the work and gain a proper knowledge of the requirements to success, then we will have plenty of best quality.

DISCUSSION ON THE VARIETIES OF STRAWBERRIES SUITED FOR MARKET.

C. I. Robords, Butler, Mo.—Who has tested the Bismarck and Clyde for market?

Mr. Fisher, Peirce City.—From one acre of Clyde I picked fine, large berries, but the dry weather burned the plants so that there was no foliage and the berries blistered. They bloomed full but rain interfered with fertilization and the fruit was not a good color. However, the variety is a good shipper and it ripens about the 22d of May.

J. K. Saunders, Peirce City.—This year we had an excess of rain at the time of blooming, so this was not a fair trial. The Gandy is a late bloomer. Most all have a blighted end caused by imperfect fertilization, and thousands never started in development.

G. T. Tippin, Nichols.—Bismarck has had considerable attention paid to it and is one of the best. Clyde is poor at some points, good at others, and there is a good deal of soil on which it will not do well, though it is largely a question of season. I have known 125 crates to be picked from one acre. Warfield is good. Aroma is better than Gandy and it is more profitable because it is a better yielder. Prolific does remarkably well and is a good shipper. Crescent is well known and good. The best four are, Warfield, Aroma, Clyde, and Bismarck. Bubach is not a shipper. Michel's Early I would not have. Crescent takes care of itself; if you thin out the plant rows they do well. Clyde is fair in flavor and should be picked early or else it will get too soft. Brandywine is not entitled to be in the list of commercial varieties. The earliest of these are Clyde and Warfield coming about the same time, Aroma late, and Bismarck between. Gandy is good but does not become fully developed. There is nothing in Lovett for the south. Clyde does best on black and damp prairie soil, without gravel. The first berries of Clyde are good but they do not hold out. Bismarck heads the list for us.

J. T. Snodgrass, West Plains.—This spring I planted fifty acres with six varieties. Excelsior for early, with Crescent and Clyde to fertilize that; Bismarck and Warfield together in blocks, and Aroma for late.

Saunders.—Philips' Seedling is large and fine but was killed at blooming time, the matured ones were good, however, and of dark, rich color. My list is Warfield, Fountain, Lovett, Splendid, Clyde and Woolverton. Haverland has been grown some here. With proper fer-

tilization and cultivation it is prolific through the season. From two and a half acres a grower picked 702 crates this season of Splendid, Lovett and Warfield, one row of Warfield with one of Splendid and Lovett on each side. They fertilized well and berries grown were better than Warfields. Difference in soil makes a great difference in fruit. Get a berry adapted to the soil.

N. F. Murray.—Michel's is of no value at Oregon, Holt county, Missouri.

J. C. Evans.—At Olden we tried Michel's two or three times but with no success.

R. H. Edwards, Peirce City.—Warfield and Crescent are best for carrying. A car load of Clyde and Bismarck not nearly so good at market, but Michel's as good as on the ground, and it is earliest in this country—ahead of Excelsior.

D. S. Halvern, Arkansas.—I am a friend of Michel's Early. I made \$485.00 off four acres, not on rich land, in fact the poorer the better. It is a lazy man's berry, when planted on hills and valleys; indeed the vines grow too thick in the valleys. But it is the finest berry found on the rocky hills. It bears 60 to 75 crates per acre, sells at \$3.00 a crate, though it runs down later to \$1.50. The variety was originated at Judsonia, Ark. Murray's Early, said by the nurseryman to be just as early as Michel's and four times as prolific, proved to be a miserable failure. Westlawn and Imperial Westbrooke are prolific, with good color and are good shippers. They come with the Crescent and grow double at first but afterward nice sized berries load the vines. The market broke at Kansas City and four days after we stopped picking we found dead ripe and firm berries on Westbrooke vine. One evening we sent seven crates to Peoria, and one in the morning and all went through in good condition, sold at \$1.75 per crate and netted \$1,16. Westlawn ship well, has dark foliage and an even dark color, bears 100 crates to the acre and holds size through the season. We sold one lot of four crates at the depot for \$1.15. Even after it has been ripe for several days it carries well, while Michel's Early will not. Bubach is as good as any we have.

Henry Gugel, Mt. Grove, Mo.—Clyde went ahead of them all this year. From five rows 100 yards long at the second picking we got seventeen crates; at third, got twenty-two crates. Twelve berries filled a box too full to pack. It ships well if properly handled. This is picked, early, when pink. Twenty-one crates were picked Monday evening shipped Tuesday evening to Birmingham, went through all right and sold Thursday morning at \$2.00 per crate. We can ship them to New Orleans in good condition, and consider Clyde one of the best large and prolific varieties. Bubach ranks next. Westlawn grown for three years in matted rows in field gives nice berries.

Levi Chubbuck, St. Louis.—Differences in experience with growers is effected by different soils. Is it possible for science to determine the soil suitable and prepare it chemically to make soil adaptable to various fruits and varieties?

Prof. Stinson, Fayetteville, Ark.—Best method for testing is actual trial; some need rich ground, some do not.

Prof. Irish, Mo. Bot. Garden.—Chemical analysis will not determine value for varieties. The only way is to actually test. Each must try for himself as result may be opposite.

Prof. Whitten, Columbia.—I agree with the professors on the value of analysis test, but often much can be told, as for instance what strawberries contain, also the food needed, viz., nitrogen, potash and phosphates; but the amount of difference between soils and varieties is too fine for the chemist. It is best to try on your own ground. Nitrogen is for the plant, phosphate for the fruit, but test must be made for varieties. Soil may show potash and yet not in a form that the strawberry can get hold of, and this the chemist can not tell. Food elements must be soluble and set free from others. Some times these points can be ascertained but not exactly enough for varieties.

L. A. Goodman.—Some specimens of soil from the Ozarks were sent to Prof. Schweitzer but analysis could not determine the best. The complications are realized when we find that on some old field where corn nor cow peas will grow, peach and apple trees will make a good growth.

H. S. Wayman, Mercer county.—This year is our first crop and we are just beginning to pick. Our varieties are Warfield, Bissel, Bran-

dywine, Lovett and later Princeton Chief, which is a heavy bloomer. We mulched well and expect fine results.

Miss Park, Springfield.—We have had two pickings from Gandy but it does not do as well as Bubach or Parker Earle. This latter is a good shipper and canner. The Warfield is good for home use but not productive. Gandy needs richer soil than our clay.

J. M. Irvine, St. Joseph.—Aroma was originated by Griesa. It looks the same from end to end of the season, is one of the best. Hav-erland grown in hedge rows is very fine but not in matted ones. Aroma does finely on loose soil. Clyde is too large for shipping in boxes.

I. B. Lawton, Arkansas.—A good word should be spoken for Michel's Early; it does good work on the rocky soil of Arkansas.

Col. Vincenheller, Arkansas.—In this day something better than the first is required, so Arkansas originated Michel's Early. It is a great market berry, but too productive. It has a rich flavor and aroma, and blooms continually. Crescent has made more money than any other in Arkansas. It is hardy, productive, showy, of moderate quality, a good shipper and not a lazy man's berry.

Tippin.—Bubach is not a shipper but is profitable for local market or twenty-four hour shipments. Michel's is not good under ice, while others will carry for sixty or seventy hours. It is better to have but a third of your crop in Michel's.

Edwards.—Michel's will ship under ice but is not productive in this section.

Helvern, Ark.—We shipped Michel's in car lots, were two days in loading the tail end of the picking, so berries were only medium but shipped well to Denver and St. Paul. Nine crates shipped to St. Paul laid over on track for a day and yet netted \$1.50 per crate.

Tippin.—Michel's brings fancy prices because it is early, but it is not considered a carrying berry and could be of better quality.

Helvern.—I helped ship the first sixteen-quart crate from Judsonia, Ark. It brought \$5.60. The name is Mishel.

Irvine.—It may be either Michael or Mishel.

Goodman.—Miss Louise Murtfeldt, of Kirkwood, Mo., has a seedling whose crop has now all been gathered, the habit is vigorous, the berry is firm, with sweet delicate flavor and is rose-colored.

J. H. Monsees, Beaman.—I have experimented for many years in seedlings and have two worthy ones. No. 1 is a staminate from Jewell on one side, other unknown. It is large and productive, of excellent flavor. The first pickings are large and rough, but afterwards better. I have grown it for four or five years and find it stands drouth well. No. 2 is a pistillate from the Crescent, the form is better than No. 1, fruit more acid, and growth less rank; it ripens about with the Crescent.

J. C. Whitten—The Experiment Station is growing various seedlings and men over the state are testing them. In the case of hand pollinated parentage there is no natural selection of pollen so the berry is not perfect. We have three or four promising seedlings, 180 varieties now fruiting and about sixty good commercial ones. This year we began a new method of crossing so as to know the parent and yet give free pollination. Crescent and Capt. Jack were grown under a frame and forced into bloom a month before others, then we put in the bees so there was a natural selection of pollen and the plants grown from the resulting seeds we shall try. Next year we want to take Crescent with Sharpless to find if there is a difference in affinity between varieties. This combination has given 80 per cent good seedling while another gave only one in a thousand. A systematic following of this plan may show certain crosses give better results and indicate affinity of types. Reports last year show results variable with three or four varieties. Pedigree in plants is not thoroughly understood. Selection is the salvation of horticulture in giving varieties; improvement is chiefly due to selection. This society has always manifested its interest and patience with our experiments. Strawberry breeding is limited to a cross between two varieties; for this gives us from four to five thousand seeds and that many plants and varieties to keep track of. We keep the per cent that are free from rust and blight, the per cent having runners and those that do not, the relative hardiness, productiveness and quality—all this is recorded and it means an immense amount of work. Four or five thousand varieties to taste will make you sick for three weeks. The amount of work is enormous, the note-making is tedious and there must be constant weeding out; so that results are slow, but they are sure.

Goodman.—We are glad of the experiments, and failures are as valuable in teaching, as success. I believe in selection and think we

blunder in our failure to follow it out. Pedigree means breeding a plant from certain known parentage.

Levi Chubbuck, St. Louis.—Does pedigree mean simply the known part of the life? Has not every seedling a pedigree?

L. E. Clements.—One thing has as much pedigree as any other, but it is not always known.

W. H. Barnes, Topeka, Kan.—Pedigree usually means a record of ancestry.

Murray.—Advertised pedigrees means nothing; the whole is not known.

STRAWBERRIES:—THE DEMAND; THE SUPPLY.

By G. A. Atwood, Springfield, Mo.

The strawberry season of 1899 is closing as this State Horticultural meeting opens. Many growers are saying that the supply has been far in excess of the demand. Those who have lost the money paid for crates, for picking, who paid large sums for cultivation, or, who performed that work themselves at the cost of many backaches, whose berries only sold for enough to pay freight and refrigeration, insist that the supply has been in excess of the demand.

Some of the unfortunate strawberry culturists will not agree with this paper. For no class of workers have we more sympathy than for the men who are making a specialty of growing this best of all fruits, and our earnest purpose in presenting these pages is to give facts and opinions that will help, in some measure, to improve the conditions that surround thousands of berry growers in this section which is specially adapted to the production of strawberries..

It is pertinent to remember here, in considering this question, that north Arkansas and Missouri are inseperable. The measure of success made in Missouri is largely regulated by the record made of the earlier crop in our sister state. In 1897 Missouri led Arkansas in amount of berry production, but this year twice as many berries were grown in

Arkansas as we have produced and prices, therefore, were largely regulated by our neighbors who were first on the market. It some times happens that there is an over supply in one district and a shortage in another; some times one market is overloaded and another is empty. Because of these accidents shall we decide that the supply is larger than the demand? Because one or two towns grow more berries than can be conveniently handled, and losses result, shall the cry of a surplus be allowed to hinder the development of our important interest?

There was an oversupply in the Van Buren district of berries that were damaged by rains but there have been none too many fancy and grade A berries, and not a car load of such berries has failed to pay a profit.

Before further considering the problem of supply and demand, in justice to the situation an account should be made of the influence exerted by the two tremendous storms that visited the Van Buren section the fifth and sixth days of the shipping season. Had no damage been done by the storms every car load shipped from Van Buren would have returned a profit to the growers. As it was the berries that were picked immediately after the rains, the finest of the crop but for their water-soaked condition, arrived in market soft and did not pay cost of shipping. Good prices were received for the car load shipped before the storms. We were in Van Buren the nights of these calamitous downpours, and it really seemed, as the rain came in torrents, as the hail was shot from nature's rapid-firing guns automatically by electricity that filled the midnight sky with the blaze of noonday, that every berry and plant would be driven into the ground. It was an anxious time for the owners of the 8,000 acres of berries that were so mercilessly pelted and for the friends of these enterprising, hard working men who depended upon their crop to pay last year's deficits. The berries did not appear to have suffered nearly so badly as was feared. A number of car loads were loaded and shipped the two days succeeding the storms, but the berries did not pay charges. They were water-soaked and they "fell down" on the way. Fully fifty car loads were shipped from Van Buren the third or fourth day after these storms that swept over the Boston mountains. The depression caused by putting so many soft berries on the market affected prices the remainder of the season. Thus

there was an over supply of damaged berries. Had our Van Buren friends picked the water-soaked berries and canned them, or made them into pure berry juice, or lacking a factory had they dumped the berries into the Arkansas river, the final results would have been better. The later shipments paid satisfactory prices.

Supply and demand should be considered in another light. It is a mistake to have so large acreage as Van Buren, Salisaw and Sarcoxie have cultivated for two or three years. It is difficult to get enough pickers and many that are secured are undesirable help. When 10,000 pickers are required at one point, many characterless persons swarm to these centers, thus restraining many worthy home people from earning money, because they do not think it safe to work in company with an army of strange men, women and children. If the 4,000 acres at Van Buren, if the 1,500 acres at Sarcoxie were divided between six or eight towns, the picking would be done largely by home people, by the worthy poor who would welcome berry picking time as an annual festival occasion. They would observe the rules of picking, would grade the berries as they picked them, thus reducing the cost of marketing. They would take a personal interest in the success of the growers. Van Buren growers paid two cents a quart for picking—forty-eight cents a crate. The ruling price in south Missouri is from one cent to one and a quarter cents a quart. Sarcoxie pays one and one-half cents. Forty-eight cents for picking is positively beyond reason and never would have been paid but for the fear that the unreliable army of strangers would desert or strike at a critical time.

There is still another very important point to consider in this discussion—that of over-sized plantations. It is a mistake to plant the whole farm to strawberries. At Fayetteville three gentlemen, practical growers, have a farm of 290 acres in strawberries. At Salisaw on one farm there are 350 acres in berries. The owner of this farm leased portions of the place to neighbors. At Van Buren there are berry farms of 275, 135, 125, 75, 60 and many of 50 acres. If there were no fields larger than ten acres and the present acreage was thus distributed the profits would be ten times as much as has been realized this year, because the berries would grade higher. One third of the berries shipped

this season were under size, they sold at no profit, many of them at a loss, and so the best grades had to pay freight on the inferior fruit. It was resolved at the splendid meeting of berry growers who met in this hall February 7 and 8, not to ship any of the small stock, but many growers repeated the mistakes of past seasons and shipped unsalable berries to compete with their own better grades. Associations should make out statements showing the amounts received for each grade shipped this year. If this is done next year there will be no sacrifice of fancy and A grades to pay for freight on B and zero grades. Yes, indeed, there is over-production of small berries but not of large ones.

Praise is due to the men who in the beginning of the berry industry in this southwest country, backed their faith in the business with their money, who helped to make up an acreage large enough to permit car load shipments, but now, where there is an over-acreage the same public spirit that influenced these business men to help build up a new industry will influence them to decrease their acreage in berries and to plant tomatoes, cantaloupes, vegetables, peaches, etc. Not so many berry growers will buy hay for their horses after this, since they begin to realize that grass is as profitable a farm crop as can be grown.

The more we investigate supply and demand the greater the subject seems, and the firmer the position we have taken. We can prove by witnesses now in this convention that there is not over-production, for they have not lost on a single crate and they have cleared from \$100 to \$250 an acre this year. True these are exceptional cases, but these men do this every year. If they can make \$200 from one acre others can do it by growing as fine berries.

To conclude this paper without referring to co-operation and its influence upon supply and demand would be like leaving the keystone out of the arch, for this grand principle is the key to success in berry growing. With thorough organization the problem of distribution will be solved. With organization we can secure justice from transportation companies, we can get cheaper refrigeration. During the last five weeks the berry growers have paid refrigerator car companies \$50,000, and they have paid besides this upwards of \$70,000 for freight. At the rate berries have sold this year it would take 200 car loads of berries to pay

these companies. Only through organization can growers secure satisfactory rates. There is power in organization. A committee armed with the delegated authority of 10,000 fruit growers can meet with the officials of transportation companies on an equality, they would be received with courtesy and depart with an agreement to their reasonable demands in their pockets. This year we have had good service. The influence of the Peirce City and other meetings of cooperation societies has had no little influence with the railroad and refrigerator car companies. But we did not get the reductions we hoped for. Next year these companies will not transport and ice so many cars; growers are concluding to ship only as many cars as will at least pay charges, and unless rates are considerably reduced the berry interest will be permanently curtailed. Growers want the railroads to do a profitable business, but this year they have paid thousands of dollars for transportation of berries for which they received nothing—not even getting cost of crates or packing back.

Sometime, if the berry interest is cultivated our railroads will own enough refrigerator cars to convey our fruit and then we shall only have to pay for the ice we use, as is the case in Illinois.

The importance of shipping only the two best grades of berries has been presented. What is to be done with the small berries? The thing is, not to grow small ones. Have strong, young plants, give them thorough cultivation and there will be no small berries. Should there be a lot of small berries, work them up into unadulterated strawberry juice.

New York has just passed a law making it a criminal offense to sell any adulterated or chemically made fruit juices. Only the pure juice of berries or other fruit is now used in the preparation of soda water, etc. Call for strawberry extract in New York, and if you are served with the usual colored chemically made mixture that never was near a strawberry, the owner of the fountain has committed a criminal offense and is subject to a heavy fine. Make the small berries, if there are any, into preserves, as has been done at Republic this season, or into pure fruit juice.

Finally, we claim that there are not too many berry growers, but there are too large plantations. If there were no fields of over ten acres

and not over 1,000 acres at one shipping station, if the plants shall be well cultivated, there will not be too large a supply for the demand, provided our organizations are maintained and the spirit of harmony and confidence prevails. If the railroads and express companies will co-operate with us genuinely, we can send out 2,000 car loads—crating only fancy and A berries and the supply will not exceed the demand. If present conditions are to continue then there is over-production and there will be until growers have been further punished.

DISCUSSION ON DISTRIBUTION.

Evans.—Over-production should be qualified, it never has been west of the Mississippi, but we do need better distribution. A hundred towns in Missouri have gone hungry for strawberries this year while thousands sold in Kansas City for fifty cents a crate.

Chubbuck.—I indorse Mr. Evans; the larger towns and smaller ones, too, were not supplied with berries; while St. Louis market was flooded and we bought too cheaply.

Henry Wallis-Wellston.—One great fault is with the commission man, he wishes much profit and allows none to the grower. St. Louis men will not ship to the smaller places.

Irvine.—The commission man at St. Joseph received berries in good shape and sent them at \$1.75 a crate to Nebraska, but the Nebraska man returned only fifty cents a crate because he had soft berries at that before. There are two trains a day from St. Joseph to Kansas City, but one express company will not transfer to the other which has more trains, preferring to send way round by Omaha just to get more express.

Barnes.—We are to blame because we over crowd the companies. I have seen thirty cars come into Topeka in one day. One day ten cars of produce stood on the track, the stuff was sent on commission. The best rule is to buy it, pay for it and resell, we get more by sending to small towns. We need to telegraph, mail is not fast enough to find prices at a market. We should not crowd into the great centers, nor hide from our neighbors what we are doing.

RANDOM THOUGHTS ON SMALL FRUITS.

M. L. Bonham, Clinton, Mo.

This winter has been a test for hardiness in small fruits, and although we hardly expect a repetition in this climate of thirty degrees and more below zero, yet other things being equal, the hardiness of a variety ought to have a prominent consideration. The raspberry, blackberry, grape and in fact most fruits have suffered this past winter. I find that young thrifty plants and trees have withstood the cold better than those that have been weakened by age, disease or bad treatment. Young, healthy, well cared for plants will withstand extremes in cold or drouth, or disease, while a poor, weak one would be killed by either cause. There is a maximum in all plant life, an up grade and a down grade. It is useless to try to bring out a patch of small fruit that has degenerated or that has absorbed the necessary food. The best plan is to renew by growing on fresh ground, destroying the old plat and planting to something else. The strawberry will generally be most profitable if not grown more than two years on the same ground. The raspberry will generally do well for four or five years on the same ground before it deteriorates. The blackberry about the same. The grape will do a little longer without changing, but to be successful with small fruits, you should never reset on the same ground, the same sorts of fruits, unless by rotation. Resetting an old orchard, especially of apples, is always attended with failure. Sorts differ so much in different localities that it is difficult to make an intelligent selection only by experience, but we, to be successful, should profit by others' experience; it is safer nine times out of ten to select old and well tried sorts than to try new ones, even if they are puffed up, for the bubble will burst and you will be none the richer, but wiser. Such experience is a dear schoolmaster. The strawberries that do best for me are Michel's (if grown in hills), Cumberland, Triumph, Bubach, Beeder, Jessie, Gandy. There are a few very promising new sorts that it would pay to test in your locality, the Wm. Belt, Glen Mary, Clyde, Nick Omer, and perhaps others. The raspberry has few sorts. I would recommend Palmer, Kansas, Onandaga, Gregg, for black or tip sorts; of the red sorts, the

Turner, Phoenix, Loudon, Miller are good and hardy here. Of the blackberries I must give a preference to the Snyder; Erie, Kittatiny and Early Harvest are good. There are other sorts that are good in some places, but the above do best with me. Of the grape the Moore's Early is a great acquisition, being large, early and hardy, before the Concord. We have the Woodruff Red, this sort I consider the finest of the hardy sorts that do well here, although it sometimes suffers here by a drouth in August; the Jewell is a hardy early sort and very good. We also have the Campbell's Early, that is highly recommended and certainly very promising and worthy of trial. Elvira is a very hardy and prolific sort, but not of the best quality. Ives' Seedling and Wyoming Red are good and free from disease, but are rather small. There is a new dewberry that I forgot to mention in place with the blackberry. It originated in Texas and is called Mayes, or Austin Improved; it is larger and more prolific than Lucretia. The dewberries are fine for the table and always sell well, as they are large, showy and early. I will mention only a few of the diseases and insects of small fruits. Spraying with Bordeaux mixture is a remedy as all know for fungus diseases, such as grape rot, authracnose on the raspberry and blackberry, etc. There is an insect that has almost destroyed my grapes for a few years that is called the grape leaf roller; it produces several generations in a year and if not checked will soon destroy the fruit and even the vine, as it destroys the leaves so as to stop all growth of vines and fruit. By going over the vineyard and destroying the worm in the leaf as soon as discovered, will keep them in check; also rake up and burn all leaves and rubbish in the fall will help get rid of them.

The rust in the blackberry can be kept out usually by going over them two or three times in the spring with a spade and cutting out, root and branch, all that shows the signs of rust. The strawberry is kept healthy and free from disease and injurious insects by not growing on the same ground too long and by mowing vines off after the fruit is done and taking a rake or fork and drawing most of the leaves or mulch between the rows (of course the rows run north and south) and on a dry day set fire to them when the wind is right to carry fire straight between the rows.

Most of small fruits are best with a level cultivation on well drained, rolling land, but not hilly enough to wash. All small fruits want

plenty of moisture, but no standing water. The dewberry likes a hill-side or ridges like a large sweet potato ridge. Small fruits all require thorough and continual cultivation if it can be done without injury to the fruit. With this I will close, knowing that most of this will be stale to many of you, yet if you get an idea or two that will profit you, I will feel I am repaid for my effort.

THIRD SESSION—Wednesday Afternoon.

DISCUSSION ON RASPBERRIES.

C. I. Robords, Butler.—Cuthbert and Turner are too tender. Miller's Red went through the winter sound to the top and is fruiting. The Kansas is the best black for general planting, Palmer is the best early and Mammoth Cluster is fair. Schaeffer Colossal is hardy and good but has larger plant and fruit.

Evans.—All varieties on my old plantation were badly damaged this year, the new ones all except Evans, this is sound and promises a big crop. It bears twice as many to the acre as any other, Palmer is next and Kansas next. Gregg and Hopkins are gone. Thwack stood the best of the reds. Lawton was killed, but I never found much good in it. It is pretty when green and a fine grower, but yields no profit. Thwack brings more dollars. The Evans is a seedling of the Hopkins, but is more upright.

H. C. Fitch, Seligman.—I have discarded all except Kansas and Progress. Gregg is liable to winter-kill. Hopkins is one of the best and gave good results for ten years and was a success until this year when it was about killed out by the cold, added to the dry weather of 1897. It bears from sixty to seventy crates per acre, while Kansas and Progress bear ninety to ninety-five per acre. Schaeffer, neither black nor red, though large, brings only seventy-five cents per crate, while others bring \$1 or \$1.50.

C. J. Eld, Bentonville, Ark.—I have discarded all raspberries because they winter-kill.

J. B. Lawton, Ark.—It is worst with the Schaeffer, which grows tall, this year's sprouts bear and then die. Kansas has the best qualities, Turner is fair, Golden Queen is good but it went to the ground last year. Kansas has the best qualities.

H. B. Wayman.—Our district is unanimous for Kansas, it does not winter-kill. The blight comes into young growth so that it dies, but only here and there.

F. E. Atwood, Carroll county.—We have used Souhegan for early with Hopkins and Gregg for late, all somewhat winter-killed; also the Early Ohio; anthracnose, looking like grasshopper bites, injured the crop of canes, but it has not yet appeared this year.

H. C. Irish.—A crack in the bark first appearing and then enlarging, is found in many varieties, anthracnose starts here easily and spreads.

D. S. Helvern.—Golden Queen we think one of the best. Hopkins, Kansas and Souhegan are grown, but vines killed quite badly. The promise for next year is good. Drouth not cold kills Hopkins. Turner sells for ten cents a quart and for \$6 a crate in Nebraska. Other money-makers are Early Harvest, Pink-berry (purple) and dewberries. For these latter fertilize the rows well, planted five feet apart and four feet wide, on a bed of rock; it is necessary to pick the berries and trim the vines. Berries are one and one-fourth inches long. Rocks keep the ground moist.

N. F. Murray.—Kansas, Hopkins, Gregg, Conrath, Babbitt and Evans do well until the cold comes. Conrath and Hopkins were killed to the ground. The best is the Kansas, except the Evans. Gregg on the same ground and with the same care as Hopkins was not hurt at all. We cut off the top of the young growth, but they keep through better when the tips are left on underground without cutting off. These netted \$62 per acre.

Helvern.—When they first ripen, go through and cut off the tops for two feet, the laterals grow later, and the berries will ripen quickly and even.

DISCUSSION ON BLACKBERRIES.

Goodman.—Early Harvest was killed to the ground this year.

Evans.—On some places hardly a sprout has started, on others near by not even a tip is hurt.

Snodgrass.—Snyder and Taylor are splendid. One-third of Harvest were killed.

Irvine.—Two fields of Snyder now promise a 100 per cent crop. The land is clean and on a north slope. Two parts are cultivated, one is in clover, the latter promises well.

Lawton.—A block of Harvest were killed and those coming up are rusted to an unusual degree. Snyder is all right.

Murray.—Of eight acres of Snyder on new ground, part is in clover, part clean where the vines are killed in places. Where timber was near they are not hurt; where there was no protection one-third are killed. We will have a third of a crop. On the low land in an old plantation the vines are killed to the ground.

T. W. Wade, Republic.—Snyder stood the test best all round, all others were badly killed.

Fitch.—Two varieties, Ancient Brittan and Snyder were badly rusted, we cut them down, cultivated and in two years were struck again. Snyder is all right. To get rid of rust the plants should be plowed out.

Goodman.—It is cheapest to get rid of it, but spraying early with Bordeaux mixture will nearly prevent it. We cut off the canes hurt by the winter and they came up again and did quite well. Taylor is later and comes second, after Early Harvest. Taylor is a luscious berry and fine, but small unless pruned heavily. The plants should be topped when three feet high, by pinching, the growth then goes to the canes. Next spring prune later to from six to ten inches and you will get all the Snyder the bushes can hold. Prune Taylor back to twelve inches.

A BRIEF ARTICLE ON THE LUCRETIA DEWBERRY.

By Frank H. Wild, Sarcoxie, Mo.

The dewberry is one of the fruits that has come to stay and will in time supersede all extra early varieties of blackberries, such as Early Harvest, Early King, Maxwell and others, from the fact that it ripens part of its crop before any of the early kinds of blackberries commence and continues through the season of early blackberries. It also has the advantage of larger size and can be picked for the same price as strawberries, which fruit they follow.

They should be allowed to trail on the ground, as is their nature, or on rocks, as we have found in our experience that when tied to a stake they do not set fruit as well as when left trailing on the ground or over straw or hay mulch.

While the past season was not favorable, plants suffered severely from the February freeze with a result of only about one-tenth crop, while our Early Harvest blackberry failed entirely, this short crop should not discourage the planting of dewberries any more than that of a failure of a crop of wheat, oats or corn.

There is in this section about 125 acres of Lucretia dewberry coming on for the following year's crop and should we have a favorable season there should be a sufficient number of crates picked every other day to load a refrigerator car if the railroad companies do not insist on too large an amount of minimum weight.

Planting should be done in the fall and a light covering of mulch to prevent their being thrown out by frost. If planted in spring it should be done as early as possible as the root growth starts very early. Plant in rows four feet apart and six feet from plant to plant in row, or 1815 plants per acre. This distance should bring the plants to meet if kept in line of row if good cultivation is given and season favorable, and a full crop may be expected the following season. A mulch of straw or other like substance should be given by lifting the vines lightly and placing mulch beneath so that the berries will be kept clean.

A good crop of 75 to 100 crates can be expected if season is favorable, and if season is early \$3 to \$3.50 per crate of twenty-four quarts

should be the price in large markets, dropping to \$2.50 and \$2 as the season advances. When lower than \$2 they may be canned and also made into all uses that the blackberry is put to, and are by many preferred to blackberries.

DISCUSSION ON DEWBERRY.

F. H. Speakman, Neosho.—The dewberry has grown well, with me, for two years. After the first crop when the canes are larger, the borer works at about a foot below the surface. The drouth of 1897 did some injury. From thirty-five acres of one-year plants I had a good crop. Some were killed by the cold, but some growth can be spared and no pruning is then needed. Old ones are not in good condition. The fruit is a large, very dark and shining blackberry. It ships well under ice; the Lucretia is said to be the only one tested. Plant five feet each way in winter and early March; cultivate both ways as long as you do not hurt the vines, then train in rows and cultivate one way, cut back to eighteen inches in the spring.

CULTIVATION AND BEST VARIETIES OF GRAPES.

Hy. Wallis, Wellston, Mo.

In giving my experience, obtained during the last ten years, on this topic I wish it to be understood that I am speaking only in regard to extensive field culture and not for the amateur, growing some grape-vines in his garden more for pleasure than for profit.

Whenever the fruit grower attempts to plant a vineyard of several acres it is of the utmost importance: First, to select the proper soil, properly located on the top or slope of elevated land. I scorn the idea to plant a vineyard on low, level lands, and I think the best soil for a vineyard must have a somewhat clayey, brownish subsoil and a south-

eastern or eastern slope. The rows should be planted north and south; distance, 6x7, 7x8 or 8x9 feet according to selected varieties and natural fertility of the soil.

Second, to perform the greatest amount of labor in the vineyard in the shortest possible time (performed by well experienced hands only) with the least physical exertion, is a necessity to make viticulture a success instead of a failure, as it is with so many; therefore, time and labor-saving methods in the cultivation of the vineyard must be applied even more than in the cultivation of any other fruit, because time and labor saving or wasting means dollars and cents, the final object in view for all fruit growers dependent upon the returns obtained from the soil.

Third, only a few, the best known varieties, the best adapted to your particular soil and locality, those being the most profitable in the market, should be extensively planted, and only a few plants of the new untried varieties should be tried as an experiment, leaving this job to noted horticulturists and the experimental stations of the land.

Horticultural papers and practical vineyardists have given such a vast amount of instruction on cultivation that I have little to add to their good advises, only will say: Keep your vineyard clean of weeds. Plant two-year-old strong vines or very strong one-year vines only. Cut your vines back to three eyes the second year, letting only one, or, if the vine is very strong, not more than two shoots grow. Shorten these the third year to five or six eyes, not above two feet in length, just so they can be tied to the lowest wire about two feet from the ground. Let them fruit very moderately, from three to five pounds to the plant, pinching off the surplus buds. This is essential to establish a good, strong, healthy vineyard, to be profitable for twenty years to come. Give your vineyard every two or three years a liberal supply of good manure in return for the crops drawn from it, no matter how naturally fertile the soil may be, and do not forget annually to spray with the proper remedies to combat fungoid diseases and insect pests. Second, not claiming that my method of trimming and cultivating the vineyard is the best possible, still I shall pursue the plan outlined here, until I have learned better, easier and more profitable methods.

On account of the high value of land in St. Louis county, from \$300 to \$500 per acre, I have stocked my vineyard to the utmost capacity and

planted my vines 6x7 feet, i. e., distance in the rows six feet and the rows seven feet apart, but to-day I know that 7x8 feet would have been better. The posts are eighteen feet apart, three vines between them, and three number 12 galvanized wires stretched to them, two feet, three and a half feet and five feet from the ground. In future I shall use no wire finer than number 10. Never would I tie the vines in a bunch to single posts. I believe the grapes feel uncomfortable, like a lady laced too tightly. Beg your pardon. Personally I have no objection that the dear ladies are beautiful and dress to be beautiful, but health should never be sacrificed to obtain beauty, real or imaginary.

Prof. Munson's method of two parallel wires on arms extending from the post I do not believe to be very practical and economical in an extensive vineyard. The strictly horizontal two-arm system has its drawbacks. Often you will be compelled to use bearing vines which should otherwise be discarded; besides, the young shoots require too much time for tying up.

The simplest, most natural and most practical method for trimming is, to my belief, the fan-shape on two arms starting about one foot from the ground, giving us more liberty in selecting the best bearing vines, four or five, with about thirty eyes in all, besides leaving a short spur of two eyes on each arm to produce fine bearing vines for the next year.

Apropos! do you have the best, most practical and serviceable pruning-shear to be gotten for the money? It is the cheapest in the course of time for the great amount of labor it will perform in a skillful hand. Mine are imported from Germany, a precious tool found at last, and I have discarded all of American fabric, being only imitations having some flaw or fault.

How do I cultivate my vineyard? Surely, in trying to do the best work in the simplest manner. After the trimming of vines is finished and tied securely with willows to the wires in April or early May the rows are plowed off with an eight-inch one-horse plow, leaving a narrow ridge only seven to eight inches wide between the hills, which is hoed and raked out by hand with a common potato-hoe. After a week the ground between the rows is either cultivated with a one-horse cultivator or harrowed with a V-shaped stump harrow, doing the most effective work, and a strong horse is able to perform it.

About the middle of May we go through the whole vineyard, pinching off all shoots above the second wire but allowing the lower ones to grow as they please in order to produce the bearing vines for the next year. Generally I leave but two bunches of fruit on each shoot, rarely three, and the pinching is done mostly one eye above the upper bunch, which should be done by hand only and in proper time, as long as the tips are crisp and break easily. If this work is delayed the shoots harden soon, then the pinching is so severe on your fingers that you will be compelled to use a knife or shear, which should be avoided, as the contact of steel with the sap of the tender shoots seems to act on them as a poison, checking the growth too severely, according to information received from the well known vineyardist, Mr. Riehl, near Alton, Ill. My own observations lead me to believe that this is true and not merely imagination.

While the vineyard is blooming all work in it ceases until the fruit has fairly set and the grapes are well developed. Then in June the mellow, loose ground is plowed on, i. e., towards the vines. If necessary the soil will again be stirred up shallow in July with the cultivator, and I am through with cultivating for this year's crop. Late in fall, about November, the plow will throw two furrows towards the hills, leaving the soil in a rough condition that Jack Frost may more easily perform his subtle work in breaking up the elements of the soil to nourish the vines during the summer season.

The pinching off or breaking out of the secondary sprouts or suckers starting from the axes of the leaves on the bearing shoots (called "gaizen" in German) I have discarded long ago for several reasons. The gain on fruit (if a gain really is the result) does not repay for the immense amount of labor involved. The grape will ripen in the shade of its leaves, and the many sunburned grapes which I have seen in my own and many other vineyards stripped of their foliage induced me to let nature take care of itself. Scientists tell us that these secondary sprouts or "gaizen" assist to develop the character of the fruit to perfection and their full growth quite necessary to give aroma and bouquet to the wine made therefrom. In France lately experiments have been made to draw this extract directly from the leaves, and by adding it to the grape juice is greatly improving the quality of the wine. The long, tender shoots

between the first and second wire are carefully tied up as time permits. From the last days of July to the latter part of October some fifty varieties are sampled in succession and many friends, birds, wasps and bees share in our enjoyment of God's bounteous gifts.

BEST VARIETIES.

This is a very ticklish question to answer, and as every mother believes her children are the best and prettiest, so I have also a choice of my own, but I do not have the least objection that other vineyardists will make a different selection. Tastes are different and no law will regulate them. The really best varieties indeed are of rare occurrence and lately I have come to the conclusion that my friend Mr. Riehl from Illinois is about correct in saying that among our 500 varieties of grapes are hardly ten good ones worthy of general cultivation. I can not vouch that this great vineyardist really made this assertion, as I obtained it not directly but only from a friend. Nevertheless, when I recall last year's visit of Mr. Riehl, scanning with an eagle eye my vineyard, containing some fifty varieties, with word and looks condemning most of them, I must say that I felt a little sore inwardly, but it set me a-thinking; guided me to more severe judgment, and after the severest winter-killing of grapes during February, 1899, I have adopted the same opinion.

What varieties can be classed among the best grapes? Only those deserving extensive field culture by the thousands of vines; those having a great commercial value; those producing a fine wine, at least 100 per cent better than the poor wine made of the Concord; those which accommodate themselves to the widest range of climate and the greatest diversity of soils; those being the healthiest, most vigorous, disease-resisting, most productive and of the highest quality; those bearing neglect, unfavorable weather and rough treatment better than their pet sisters only suitable for the experimenter, the amateur and private gardener, where extra care only will induce them to do their best and be worth the place where they stand; finally, those which are of ironclad hardiness, able to stand from twenty-five to thirty degrees below zero without injury to buds or vines. In regard to color it must be black, because in the markets

of the land the demand for them stands as ten to one (at least five to one) in preference to red or white varieties.

Last year I had the pleasure of visiting the experimental vineyard of my friend Sylvester Johnson near Indianapolis, Indiana, veteran horticulturist and an authority on grapes, where I saw fruiting (and sampled most of them) some 120 varieties of the choicest grapes, including many of Prof. Munson's new creations, but I would hardly plant ten of them extensively, while I will try soon at least fifty of them on my experimental grounds.

The best grape of the land to-day, not having its superior, is the grand Hicks—the Queen of Grapes and the new Concord of the 20th century. It is destined to take the rank and position throughout the land which the old Concord held for the last half century. My friends, allow me to say that I do not make this statement as the originator and introducer of it having an axe to grind, but simply speak as a practical vineyardist who has tested it most severely for ten years before offering and recommending it to the public, for the last five years searching in vain for a better grape. It has all good qualities combined and no faults either as a table, market or wine grape, the grape conquering the land on its real merits alone, being the grape for the millions for the next fifty years to come, as the old Concord was for the time past. All doubting Thomases are kindly invited, for their own profit and benefit, to plant the Hicks and very soon they will be convinced that I have spoken only the truth.

Worden, Brighton and Moore's Early belong to the class of best grapes for many years to come, but the Concord must take a back seat. According to my judgment it is to-day only a second class grape, no matter who thinks contrary. Norton's Virginia is an excellent wine grape, but was not hardy enough this year. Others of that class I have not tested enough to judge on. St. Louis, a new seedling of the Concord, tried near St. Louis for twenty years, is superior to the parent in vigor, health, productiveness and quality. Campbell's Early, if not classed among the short list of best grapes, will at least hold its foremost position among our good grapes, even if the last severe winter proved that it is not of ironclad hardiness, perhaps on account of having foreign blood (Black Hamburg) in its veins. The noble, large McPike suffered

for the same reason, still I hope it will hold its place among our best grapes.

Pigs' feet and oysters! Who likes them says: "Ah! They are just delicious." But he who does not will not swallow them. This remark I made a few weeks ago when I was reading the transactions of the State Horticultural Society of Illinois from 1898, and to my astonishment found the noble Campbell's Early by some experimenters classed among the grapes of poor quality. (Perhaps Champion, Ives and Pocklington are the standard of high quality with them. I don't know.) Having eaten this splendid grape myself I take the liberty to tell these judges that they either have a poor taste, their palate not being in condition to judge the quality of grapes properly, or the soil of that portion of Illinois must be so poorly adapted to viticulture that this grand grape degenerated with lightning speed. Many persons are color-blind, others can not distinguish sounds or tones to appreciate good music, also the nerves of taste act queerly in some persons. To do justice to the originator and introducer of Campbell's Early, who spent thousands of dollars and immense amount of labor in its introduction, I ask only one question: Are these testimonials obtained from all parts of the Union a fraud, or were those hundreds of horticulturists who classed it among the best grapes of highest quality, hypnotized to make the statements against their will?

My favorites or red grapes are Goethe (Rogers' No. 1) and Woodruff, the latter much hardier than the first, which froze down to the ground last February, but I shall replant it. Niagara is the only one among the white grapes which I found profitable for extensive culture for market purposes. The beautiful Diamond does not do well with me.

For the garden and pleasure the following rank among the best: Black—Cottage, Wilder, Eaton and Mills; red—Diana, Lutie, Salem and Brilliant; white—Green Mountain, Diamond, Opal and Lady Washington.

Finally, I must condemn the continued practice of many fruit growers to plant vinegar-berry vines, commonly called grapes of poor type and quality, like Champion, Ives, Hartford, Janesville, Pocklington and many others. The real damage done by them to the viticulture of the land can not be over-estimated.

In the *Ruralist* for January, 1898, I found a valuable article on "Profits of Grape Growing" from the editor, R. L. Gulick at Gluckheim, Maryland, giving the results of his experiments with 130 varieties of grapes during a period of nine years, very interesting to progressive vineyardists. His final conclusion is: "As far as tested all varieties of grapes are superior from home grown vines." It may be that they become acclimated and there is a constant improvement where cuttings are taken from vines which are most productive or produce finer fruit than others of the same variety. My friend, Mr. Hundhausen, from Herman, Missouri, told me last year: "Our Norton's Virginia has here improved wonderfully the last twenty-five years. It is at present nearly double the size it was then."

But the car runs off the track by touching the pedigree question, now discussed in many agricultural papers. I believe the name "pedigree" is itself the main stumbling block, but I do not wish to tackle a hornet's nest and I had better quit in time.

The most complete information about the grapes of our land will be found in the *Bushberg Manual of Grapes*, which precious volume ought to be in the hands of every practical vineyardist.

Let us all strive toward perfection, especially in viticulture and horticulture in general, that our children may profit from our toil and bless the noble work of their ancestors.

DISCUSSION ON GRAPES.

Snodgrass.—I like Moore's Early, it brings the most money. It is the best table grape. Training by stake is more economical than by trellis and with us hoeing is not profitable, our hills are too rocky. Goethe is the best red. Pocklington and Niagara are best white. For red wine grapes Norton and Cynthiana; for white, Cunningham and Herbemont are best. Herbemont is somewhat delicate, froze to ground last winter, but this year have grown twelve or fourteen feet. Cynthiana stood well in the winter, but is too easily injured by spraying. Goethe will be a half crop this year.

Nelson.—Worden and Moore's Early are the best. Norton is nice. Niagara and Empire are recommended for white. I saw the Hicks in

Omaha last fall. It is a fine grape and will stand thirty degrees of cold. Moore's and Worden are good table and market varieties.

Wallis.—The Hicks ripens a week before the Concord and with the Worden, it is equal to these, only more vigorous. The under side of the leaf is white.

Whitten.—Moore's is the early grape. Janesville, Hartford and Mary Ann come early, but none are good enough for market. Some color before Moore's but they are not ripe as soon. Green Mountain is the best white, of fine quality, early, not so large as Niagara. By sacking in the bud it is found capable of self-pollination, and sets just as fine bunches, with fine flavor and delicate skin; it is improved more than others by sacking. It is like the delicate hot-house forced varieties, and cures into raisins. The fruit holds onto the vines longer if sacked early. Niagara and Diamond are also good white grapes. The Wells is large, fine grape with musky flavor, color is bronze green and it produces enormously. Vines of Aminia planted six years ago have fruited for six years; it is one of the best. The berry is dark red, translucent and large. The plants are vigorous and productive, not so hardy nor vigorous as either Moore's or Goethe. This grape is a splendid table variety and brings eight cents per pound. It should not be neglected but kept thin so as not to overbear for afterwards it can not recover its vigor and it loses its sprightly, delicate flavor. Norton's is better than Catawba. The Ozark is remarkable, pruned to three canes it bore ninety-three pounds of fruit. The canes are vigorous, out-stripping others in wood-growth. It has the largest bunch of any of the Aestivalis. It keeps like Norton's, has good texture and ships well because it is not too juicy. The Hicks is certainly one of the hardest, the fruit is good and deserves particular notice. Campbell's Early grows nicely, has fine quality and is the coming early grape. McPike is a magnificent big grape. Columbian Imperial is the largest, coming very late, ripening after frost. First crop is good, afterwards not so much so, as grape rots and causes vines to lose vigor. Moore's ripens ten days before Concord, seven after Green Mountain, the first grape about August 13.

Snodgrass.—Moore's in south Missouri ripens in July and first of August.

Goodman.—Kansas City wants early grapes, therefore plant Moore's Early and you can have it on the market ten days before Concord. Campbell's ripens the last of July and is worth a trial. There is money in the early varieties.

Whitten.—Early Ohio, productive and early next to Moore's, it can be eaten earlier but is not good flavor. It has a large bunch and ripens evenly.

Snodgrass.—With us it does not ripen regularly, but has green berries on the bunch with the ripe ones.

DISCUSSION ON INSECTS.

Member.—Curculio in a Ben Davis orchard seems to cut a semi-circular sting on the apples and check their growth.

Miss Murtfeldt, Kirkwood, Mo.—The apple curculio does make the semi-circle but the plum curculio stings apples. Apples drop from other causes.

Lamm.—A little borer in the plum tree limbs is liable to kill my orchard.

Miss Murtfeldt.—This is the bark beetle and the remedy is to cut and burn. Cultivation does not help.

Evans.—What shall we do for insects on our rose leaves?

Miss Murtfeldt.—The insect is the rose slug and hellebore in powder is good, or as a tea sprayed at night, made of one ounce to two and a half gallons of water.

Robnett, Columbia.—What of Liggett's Champion Dry Powder to use instead of Bordeaux. I use lime for those fellows on the plums.

Miss Murtfeldt.—Bordeaux is for fungus diseases.

Evans.—Will a light trap catch the codling moth and will it catch our friendly insects?

Miss Murtfeldt.—The light-trap will not do away with codling moths to any extent but will catch other enemies, though not many friends, as but few fly at night.

T. W. Wade of Republic gave many valuable points relating to the canning industry. He claims that southwest Missouri is the center of

a great canned goods industry, if properly encouraged. No place in the world can produce a finer quality of tomatoes. This industry will give employment to many hundreds of people.

The industry can be made one of the greatest in the state, but has been badly neglected. Missouri can put up goods from five to ten cents cheaper on the dozen than other states owing to producing goods cheaper. Tomatoes in Missouri at \$5 per ton yields good pay per acre. When building factories go to a practical canning man and one you know. With a few more factories in the state they could keep a can factory running the year round. One crate of raspberries will put up about two dozen three-pound cans; strawberries one dozen to the crate. Cost from sixty-five to seventy-five cents per dozen including everything, f. o. b. The factory process can make a really better product than at home, as the cans are sealed before cooking and so retain their special flavor. We use only the best white sugar. Think we can find a way to retain color in strawberries by using some harmless coloring to bring juice up to same color of fruit.—From Western Fruit Grower.

DISCUSSION ON CANNING.

Goodman.—How many two-pound cans do you put up from a crate of berries?

Wade.—Raspberries and blackberries will make three dozen, strawberries, two dozen.

Goodman.—It seems to me it might pay to establish a grade of fine preserves for family use.

Wade.—We make a good syrup so avoid the usual tasteless watery goods and the flavor is retained by sealing before cooking.

Snodgrass.—Canning factories could have a reputation and big trade if people felt they were getting pure materials.

Wade.—We use the best white sugar. The color of our berries will hold for a year.

Atwood.—The Republic factory ships two grades of berries and this way of using small berries makes the business a help to the growers.

Goodman.—Can you put up fruit in glass jars?

Wade.—This is not practical. We use a fifteen per cent syrup and this is better than most canners use.

Irvine.—If we could get as fine goods as are sent out from Curtiss Bros., of Rochester, N. Y., it would be a fine thing for Missouri.

Goodman.—Fifteen per cent is not half heavy enough syrup. Fruit put up in flint glass jars with a rich syrup is what is wanted in the cities.

Wade.—Such would be handled entirely differently and under a special label and price.

HOW I GROW THE PEACH.

W. F. Benson, Willow Springs, Mo.

That I shall be able to offer any new thought or suggest any new method relative to the growth of the queen of stone fruits I have not the egotism to imagine; but when I remember that since the day Eve nestled the firstborn of mankind to her bosom there has always been a beginner in the lessons of life, one who has the A B C of knowledge to acquire, I do not hesitate to offer for the study of the infantile membership of the great family of Missouri fruit growers my method of growing the best fruit the Creator has deemed it wise to give us—the peach.

I consider successful peach growing easier than any other branch of horticulture. A suitable location is the first requisite. In determining this two factors, climate and accessibility to market are so absolutely essential it is hardly possible to say which should be first. We can not make the climate, and—well, the same remark applies to the market. An unfortunate condition at present is, that in general these two prime essentials are so far apart. The best markets are our great cities. New Jersey and Maryland orchardists find practically a home market in New York, Philadelphia, Boston and the smaller cities of the Atlantic coast for all they can produce, and Michigan's rapidly contracting peach district is in close touch with Chicago, the best fruit market west of the Appalachian range. Georgia, Missouri and Arkansas are struggling with the disadvantages of long distance markets and burden-

some transportation charges. To offset these we have an earlier crop, freedom from the deadly yellow and rosette, earlier bearing orchards and cheaper lands. We have here in South Missouri a climate not excelled, and rarely equaled for the production of the peach, and our acreage with that of our sister state, Arkansas, is sufficient to grow them for the whole of North America. When our transportation companies come to see that lower rates will give them more profit, ten acres will be grown where one is growing now. We need not hesitate to engage in peach growing to-day, and, all things considered, no better place can be found than the Ozark plateau. A model location is one slightly above the general level and not more rolling than is necessary for good water and air drainage. A northern slope is best and, for a small orchard, should be chosen. But for a commercial orchard we must plant all slopes. Never plant on a hardpan. A porous subsoil is absolutely essential.

Having fixed my location we will prepare the ground. New land is best. Burn the timber on the spot you wish to set your tree if possible. Plow deep, a little too deep is just right. S. W. Gilbert directed us to plow as nearly four feet as possible for strawberries, and the rule will be equally good for peach trees. The value of land for peach orchard is in inverse proportion to the square of the distance from the shipping station. Lay off the land by running single furrows one way and cross these with deep, wide dead furrows. The fertility of the soil and the probable lifetime of the orchard should determine the distance. I prefer planting farther apart east and west than north and south, as it gives better sunlight. Eighteen to twenty feet by fourteen to sixteen is about right. Wider spaces should be left at intervals for driveways.

The selection of trees and varieties is all important. Plant none but first class trees. Never be tempted by low prices to buy any other. A first class tree is not necessarily a large tree—rather one of medium growth with plenty of sound roots. I prune the tops to a stub twenty to twenty-four inches high, and cut the roots back to sound wood. I prefer planting in February and March if the weather is good, and in the fall rather than late in spring. Rub off any superfluous growth on the body of the tree and let all top branches grow unless heavy side growth is being made. In winter or early spring cut all branches back to three or four buds.

During the second year's growth keep the top as even as possible, or a little heavy to southwest. Next winter or spring cut back again to four or five buds. Good tillage should have been given and must be continued, and if the growth is great clip the ends of all limbs as fast as they make eighteen inches growth. This will bring out laterals and fit the tree for making a full crop of fruit without carrying it on ends of long branches, as so many of our four-year-old trees are allowed to do. This is the year that our peach trees are oftenest spoiled. The growth is great; the fruit buds are at the extremities of the branches and pruning back as much as the making of a perfect tree requires will remove nearly all blossom buds, and so we are to leave the branches and fit the tree for dehorning in after years, a thing never necessary if each successive season has its proper work done. It requires the same nerve to rightly prune a peach tree during its first three years as to properly thin its fruit when overloaded. The man who thinned his peaches sufficiently the first time he tried it has not yet made himself known. The work should be done before the pits begin to harden.

Leave the best fruit at distances of four to six inches. When your tree is full and you have to take off three or four and leave one, it looks like a destructive process, but it will pay. The vitality of the tree is taxed, not in growing the large fruit, but in producing too many seeds, and there is more profit in one bushel of extra choice fruit than in a wagon load of culls.

There are numerous enemies of all kinds of fruit and the peach has its full share; but thanks to the chance, or the intention, in the location of "Grand Old Missouri," she is escaping the most destructive of them. Coming to this section over ten years ago from the very center of the Michigan peach belt, I was naturally inquisitive as to the advantages for peach growers here, and finding a man who seemed willing to answer, I plied him with numerous queries and finally asked: "Do you have the yellows here?" He promptly and with evident satisfaction, replied: "Yes, sir; great big, nice ones." He would hardly believe I had referred to a disease. I have not yet heard of a case of the yellows in our state. and perhaps the long sought for cure, or prevention, may be found before the worst enemy the peach grower has yet had to deal with comes to

give us battle. If our people persist in buying trees of the eastern or Michigan nursery man, sooner or later the yellows will be known here. Bad as this year's freeze has been, it is, compared with peach yellows, as a zephyr to a cyclone. The borer, curculio and rot are our worst enemies and I am able to control only the first. The numerous preventives all peach growers are familiar with are more or less valuable, but the only "dead certainty" is the knife.

I do not believe in trying to fatten two hogs on feed enough for one only. I do not believe in trying to grow six stalks of corn in one hill, and I do not believe in trying to grow an orchard on land that is at the same time devoted to wheat, or oats, or corn, or potatoes. After the second year, a peach orchard should be kept clear of all crops that tax the soil. If wheat growing will pay better than peach growing, pull out the trees, if not, keep out the wheat. I have never seen a crop of wheat and a crop of corn grow together on the same land, and I have never seen, and never expect to see, a successful peach grower who practiced planting his orchard to grain. I plant corn the first and second seasons, and nothing but fertilizing crops afterwards. Fertilize the orchard, thin the fruit, pack none but first quality, sell at your station or ship through the Shippers' Union, and peach growing will pay better than any other top-of-the-ground industry on the Ozarks.

COMMERCIAL PEACH GROWING.

Wm. B. Hoag, Mt. Grove, now a student at the Agricultural College,
Columbia, Mo.

Little need be said on this subject in general to the successful peach grower, but it is the beginner who contemplates planting an orchard that should by all means seek counsel of those who have had experience.

The question is often asked, "In what part of the United States can peaches be grown most successfully?" I answer, in south central and southwestern Missouri and northwestern Arkansas. Of course peaches can be grown for home use in every state and in almost every part of any.

state, if care is taken to select the right kind of site, to plant varieties adapted to the climate, and in the northern states, to give winter protection. Even along our northern border, peaches may be grown out of doors, if the trees are dug under, tipped over and covered with some material for protection during the long, severe winters. Some of the finest peaches have been grown in this way, but such care and attention can not profitably be given in a commercial orchard.

The climate is one of the first considerations in the selection of a location, and we have in the United States a wide variety to select from. It was formerly believed that the peach was a tropical tree and must have a warm climate, but that theory is not well founded. The peach is probably a native of China, and it succeeds best in the middle latitudes. Care should be taken not to select a location much subject to severe winters or late spring frosts, and also to avoid southern regions where the winters are very mild, as in such regions, the buds are often forced into bloom in late winter or early spring and are afterward killed by frost. It is best to select a temperate climate which has sufficient rain fall evenly distributed throughout the year. I should say thirty-six to fifty inches of rain fall would be about the proper amount.

Peaches may be grown successfully on various kinds of soil if all other conditions are favorable. Commercial orchards may be found growing successfully in New England on stony and gravelly soils; in Maryland, Delaware and New Jersey, on fertile loams and on very light pine sands; in Pennsylvania, on mountain soils derived from limestone and sandstone; in South Carolina and Georgia, on light pine sands and on stiff red clay lands derived from the local decomposition of granites; in Michigan, on pine sands, even on the beach where the sand is so light that it is blown about by the winds; in New York, on quite a variety of clays, gravels and sand, composing the old lake bottom of Lake Ontario, and in Kansas on the deep, black prairie soils. In general, however, the peach reaches its highest perfection on light, warm, well drained, sandy or loamy land with a clay subsoil. Muck soil, heavy clays, that hold water, and all wet, frosty lands are always to be avoided.

The shipping distance and mode of shipment to the best markets is a matter of great importance. There are thousands of acres of land in

the United States, well adapted to peach growing, which it would be folly to plant now, owing to lack of transportation.

As some states are better adapted to peach growing than others, and some sections of a state better adapted than other sections, so we find some fields on the fruit farm better adapted to the peach than other fields. The higher lands should be selected rather than the lower, and generally a hillside with a northern exposure is better than one with a southern exposure, as the northern exposure will retard the blooming period, so that the orchard escapes a late spring frost, while the reverse is true of a southern exposure, the difference being some times as much as one to two weeks.

Having found a location and site, the next thing is the preparation for planting. The ground should be plowed and cultivated as carefully as for any grain crop. It should be cross-marked and the holes dug for the trees about twenty feet apart each way, except on poor, thin soil, where they can be planted eighteen feet apart. If different varieties are planted, a map of the orchard showing the location of the different varieties should be made for future use. The ground, holes, and everything connected with the planting should be ready when the trees are received, so there will be no delay and consequent drying of the roots before planting. If it is necessary to plant on low, wet land, it should be plowed in twenty-foot lands for several years, throwing the furrows toward the centre of each land, and the trees finally planted on these ridges.

The selection of trees is a matter of great importance. Large trees are not always the best. The trunks should be well grown, straight and smooth, and the roots abundant though not too long, and as little injured as possible. The roots should not be pruned very close except to remove all broken or bruised portions, and should not be twisted or cramped in the holes. The trees should be planted just a little deeper than they were in the nursery, as the loose dirt around them will settle about an inch. The holes should be filled with fine mellow earth, well tramped down.

Peach trees generally do better on peach roots, but if the situation is low and the soil holds much water, then plum roots may be substituted

in which case the trees should be planted fifteen feet apart each way, or even twelve by fifteen feet. Trees should be selected which are free from fungi and injurious insects. Orchards planted with trees infested by borers, scale insects, or root aphids, are sure to give trouble. It is best to avoid trees growing in regions infested with "peach yellows" or "peach rosette." It is better to pay twice the value for a healthy tree than to accept a diseased one as a gift.

The proper selection of varieties is a matter of no little importance. There are no varieties that will succeed in all localities and for all purposes, so we must select certain varieties that are adapted to our particular locality and to our purpose. Some good varieties are apt to be winter killed or caught in bloom by the late spring frosts, if planted too far north; some are light bearers, and most of our early varieties as Arkansas, Traveler, Alexander, and Amsden, are very susceptible to mildew and brown rot. Some will not bear long shipment, while our best shippers, such as Elberta, are very inferior in flavor. If we wish to select for commercial purposes, we should try to combine as many good points as possible. We must select hardy, productive trees, bearing fruit of large and even size with fine color and good flavor, and firm enough to stand long shipment. In general it is best to plant the old and well-tried varieties. For south Missouri I consider the Elberta the best market peach, with several other good varieties closely following.

The orchard, after planting, should be cultivated as thoroughly as any other farm crop. Some cultivated crop, as corn or tomatoes, should be grown between the trees for the first two or three years, and this should be well fertilized if the soil is not very strong. Small grain crops should never be grown in the orchard, and after the trees come into bearing, no crop should be grown between them except clover or cow peas as a fertilizer. Cultivation should cease after the last of July so as to give the new growth plenty of time to ripen and harden for the coming winter, as much disease and damage is caused by the wood being about half matured when caught by the severe freezes of winter. Deep plowing should always be avoided, as the feeding roots are always near the surface and more damage is done by the plow in tearing them up, than

the benefit they receive from the cultivation. The peach tree is sensitive to clean cultivation and will yield no profit if left standing in the sod and neglected.

When the trees are planted they should be cut back somewhat and headed about eighteen inches from the ground. They should be pruned with respect to the main center leader so as to form a well rounded head. If several main branches are allowed to grow out from nearly the same point on the trunk, when the tree is loaded with fruit, the giving way of any of these branches is very apt to involve all the rest and cause the entire tree to split down, hence the main branches should be started at different heights. After the trees have come into bearing, the tops should be shortened annually by cutting off from one-half to two-thirds of the previous year's growth. Cut out all the dead wood, and keep the tree full nearly to the main trunk of small bearing twigs. Trees should never be headed four or five feet high as that exposes their trunks to the hot, burning sun and much damage is done.

Unless the soil is very strong it will be found necessary to give some attention to fertilizing. Generally there is no objection to the use of barn-yard manure, but when this can not be had we must depend upon clover, cow peas or commercial fertilizers. In the latter we should use principally potash salts, and phosphates rather than nitrogenous fertilizers. Too much nitrogen causes the tree to make an excessive growth of wood and foliage at the expense of the fruit. Fifty to one hundred pounds per acre of nitrate of soda or its equivalent in dried blood or sulphate of ammonia will furnish sufficient nitrogen where it is needed at all, while from four hundred to five hundred pounds of nitrate of potash, sulphate of potash or kainit can be used to advantage, if it is not placed too close to the trunks of the trees. Potash and phosphates should be put on in the fall and plowed down, but nitrogenous fertilizers should always be applied in the spring. Unleached hardwood ashes are always beneficial to the orchard. The peach grower who has never fertilized his orchard, would be surprised at the difference in quantity and quality of fruit which will result from careful fertilizing. Careful fertilizing will result in fine crops and good prices.

FOURTH SESSION—Wednesday, 8:30 P. M.

After the call to order, the program opened with music by the Kreyer orchestra. The first paper was:

DECIDUOUS TREES FOR STREET AND LAWN.

By James M. Irvine, St. Joseph, Mo.

In view of the mistakes made by tree planters in all of our counties and in all of our cities, the foregoing subject would seem to be a very practical one. In the beginning of this paper the writer wishes to acknowledge the receipt of suggestions from Professor J. C. Whitten, Professor H. C. Irish, and from William Pape, general superintendent of parks, St. Louis, as to the behavior of trees under their observation.

Trees for shade along the streets and on the lawn are necessary for the comfort of man. In this state, where we have not the severe climate of other sections to contend with, there can be no excuse for the lack of shade. But just here we would warn the prospective planter against too many trees around his residence. A few trees so arranged as to provide sufficient shade, and at the same time admit the sunshine around the house, are sufficient. The grass will be more abundant, the house and lawn will present a better appearance, and the trees, each having an opportunity to develop, will be much more perfect in form.

The number of varieties suitable for lawn planting is very large, for many trees do well on a grassy lawn which will not live planted at the edge of the brick pavement along our city streets. All of our native forest trees will of course grow on the lawn, and where properly cared for, present an attractive appearance. The maples, hard and soft, the different ash trees, elms, the poplars, locusts, catalpas, tulip tree, black walnut, horse chestnut, sweet chestnut, the boxelder, beech, the different species of birch—all these and many more do well on the lawn, and are recommended. If we were asked to express a preference for any one tree, it would be, for north Missouri, at least, the hard maple. This tree is very hardy, remarkably free from insect pests, withstands windstorms very well, and is in every way desirable. Personally, we greatly admire

the hard maple, not the least of its attractions being the rich tints of the leaves in autumn. And just here we would call attention to different varieties of hard maple. On one lawn we recently noticed at least three trees of entirely different habits of growth, and yet each was a hard maple. On one tree the branches extended almost horizontally and the general shape of the tree was very much like that of a pineapple, tapering beautifully to the top. The other trees were entirely different, the limbs being more upright in their growth. The first tree was a much more rapid grower than the others. As the hard maple grows slowly, we would plant soft maples also, the latter to be cut out when the trees of slower growth will afford sufficient shade. If nut trees on the lawn are desired, we would plant chestnut, and if fruit trees would plant the pear.

When we consider tree planting along the streets we are confronted with many hindrances. Those trees which need a great quantity of moisture and a rich soil are at once dismissed. The hard maple will also do well along the street, and it is extensively planted. Soft maple and boxelders largely outnumber it, however, because of their more rapid growth, though both are losing favor, because of the popular belief that they are breeding places for the loathsome worms which at times cover the pavement beneath them. The elm is perhaps the best tree for street planting. In the east it has been attacked by insects, and has succumbed to their ravages in many places. If given opportunity to develop and make a vigorous growth, however, the elm will be more able to resist disease and insects, and for this reason the trees should not be crowded. In many places the streets are so narrow that the elm can not be recommended. Mr. Pape, of St. Louis, also calls attention to another difficulty with the elm, which is that the downy surface of the leaves retains dust, smoke and soot and are not easily cleansed by rains, and it also sheds its leaves early in autumn. We have seen an avenue of catalpa trees along the street which presented a beautiful appearance. For rapid-growing trees, to be cut out when more desirable trees are of sufficient size, the cottonwood can be used.

In some cities there has been created the office of tree planter, whose business it is to plant and care for shade trees along the streets, the cost thereof to be taxed against the abutting property. While it may seem somewhat arbitrary for the city government to say one shall plant trees

whether he wishes to or not, when it is remembered how necessary a uniformity of planting is for best effects, the wisdom of the law is apparent. This is necessary, too, for the proper pruning of trees, and the plan does away with the butchery of trees (principally of the soft maple) so often noticed along our city streets. It is to be hoped that in cities where such an office is found experiments will be made to determine the effect upon different trees of gas and water pipes, asphalt pavement, electric lights and electric wires, for all these must be contended with in the city, and each has an injurious effect.

Along country highways trees should be planted more generally. For this purpose we would recommend nut trees. The chestnut can be grown in many places, as can also the pecan. In almost every section the black walnut succeeds, and a line of such trees along the roadside will become a valuable possession in time. In a county north of this the writer remembers a farm along one entire side of which was a row of magnificent black walnut trees. The trees were then bearing and added a snug sum to the owner's income, besides adding greatly to the appearance of the place. The fence along the road was formed of wire fastened to these trees, thus the latter were doing double duty. Tree planting along the roadside is much practiced in European countries, and should become more popular in this country.

In all planting of this description the planter works largely for a future generation, but this fact should not deter him. What a monument to his memory is a magnificent, well-shaped elm or some such tree. Let us, then, plant these trees and plant them well.

Evans.—Every word of this paper has my hearty indorsement. In this town I admire the liberal planting of trees, but the people need courage to cut some out.

Chubbuck.—What is the best tree to plant in our cities where there is so much soft coal smoke?

Goodman.—The only one is sycamore. Smoke kills all others, and also the evergreens. It would be well if the semi-anthracite coal could be burned instead of so much soft coal.

Music by the Peirce City Male Quartette.

SEEDS AND GREENHOUSE FLOWERS FOR THE YARD.

By C. I. Robords, Butler. Mo.

I have a friend whose presence is sunshine because his tastes, his sympathies and his disposition are congenial. I had an acquaintance whose presence was wintry, because he was guilty of the cruel sentiment that he would rather cultivate a whole field of onions than waste his time on such things as flowers. There is a time and place for all proper things. No one denies the healthfulness of all useful vegetables. One who will not supply his own family with wholesome articles of diet is worse than an infidel. I endorse the independence of those who so consider the preservation of their health, as to do as they please in the supply and preparation of their family diet.

But in the cultivation and enjoyment of beautiful flowers on our own premises there is remuneration from the time of the opening of the first seed leaf to the fading of the last flower, and even beyond this, for the joyous memory of a pleasant friend never perishes. Whatever tends to the enjoyment of nature's gifts conduces to health and long life. When one adorns his premises he becomes a public benefactor. Planting is not for self alone. Have you not observed when approaching the vicinity of a nursery or greenhouse how the influence of these institutions has extended a marked improvement over the surrounding neighborhood? Much of all missionary work is done by example.

Pecuniarily, flowers are profitable. An attractive home is a salable property. If, by some great disaster, the flowers of the world were to be suddenly swept from the face of the earth brides and bridegrooms would appear as mourners, mourners at funeral occasions would be in sack-cloth and ashes, and nations would go into fasting and prayer.

Because of early associations I love the flowers of childhood. The zinnias and single petunias, the giant single hollyhocks, the bold sunflowers, morning glories and evening primroses are beautiful, but alas! "out of fashion." The hybrids and importations, the wonderful novelties of the present time fully convince us that Solomon in all his glory "was not arrayed like one of these."

It is customary and proper to bestow flowers as a mark of appreciation, but do not wait until your friends are dead before you awake to the value of their friendship. If they do well tell them so. As some one has said, "I believe in a little more taffy and less epitaphy!"

Practically, I advise planting beds of all kinds of continuous blooming plants. I am not expected to advise as to arrangement of plants nor as to styles of beds. Flowers of the same variety are pretty when massed in solid colors in same bed, or in mixed collections. Do not plant too closely, for this injures the plants and spoils the effect. Tplips, hyacinths and crocus and all hardy bulbs must be planted in the fall. Some one remarks, "Who does not know that?" but there is not a spring season that some one does not call for fall bulbs or ask for bulbs in bloom to be furnished them from the open ground.

Prepare a bed by deep spading; plant the bulbs about two inches below the surface and cover with a mulch of fallen leaves. To prevent the mulch of leaves from being removed I place over all a cover of coarse sacking or burlap pegged down at the sides. Remove the burlap in early spring. Plant pansy seed in the house in flat or shallow boxes, covering seed lightly with fine soil. Sow first seed as early as first of September, transplant into cold frames as soon as plants show second leaf and give protection in coldest winter weather. Verbena seed should also be sown in boxes and transplanted into beds in open ground as soon as heavy frosts are over in spring. Feverfew and phlox may be transplanted outside before frosts are over in spring. Tea roses endure considerable cold weather and should be bedded out early; geraniums and the dazzling scarlet salvia, as soon as all danger of frost is past, giving some protection in cool nights. Cannas have been so much improved that they deserve a prominent place in every collection. These are most effective when grown in clumps or masses. The hibiscus is a great flower, but like all of its class, too soon blows out. Plant passion vines, hardy clematis, moon flowers for covering porches and screens; sweet peas for trellises, lantanas and nasturtiums for variety of color and continuous bloom; ferns for shady nooks, petunias for midsummer flowers, asters and cosmos for unfailing fall bloom, and for the close of the season and the beginning of winter, the flower of all flowers, unending in variety

of color and form, unrivaled in beauty and size, the matchless, magnificent, glorious chrysanthemum.

Oh! that each year of our lives could be as beautifully filled with the harmonies of nature, and that we might leave for those who remember us, as sweet impressions as these, our friends of the year.

Music by the Kreyer Orchestra.

Recitation by Miss Grace Flower.

Original poem by Major Geo. Bill, of Bentonville, Ark., "Paradise Lost and Regained." The poem was heartily applauded.

Sailor's Song.—J. E. Hablitt.

Music.—The Quartette.

MAKING LAWNS.

By C. Glover, Ham's Prairie, Mo.

Lawns, like many other good and desirable improvements, have been slow in coming. But as the country advances in civilization and refinement, the aesthetic principle which is inherent in man, will grow in like proportion, and exert its refining influence over the masses, and pleasure grounds instead of being the exception, will become more general and eventually lead to a higher intellectual life. The Romans, when not engaged in conquest, utilized what love they had for the beautiful in landscape gardening and making laws. But in both ancient and modern times these were chiefly confined to large and populous cities and around the residences of the great wealthy who lorded over the common herd.

The Roman style of gardening consisted mainly in geometric forms making avenues, parterres, mounds, artificial lakes, cascades, close clipped hedges, etc., all of which were too artificial and have long since been abandoned for one more in harmony with nature. The true artist of to-day hies himself away to the wild woods, where all looks flowery, wild and sweet, and studies the groups and clusters of the grand old vine-clad trees of the forest, and from them he draws his inspiration. I would not

discard the other style entirely, for a certain portion is requisite to produce that variety of scenery which attracts and pleases the eye. I would locate the lawn, like the garden, on a southern slope, so as to be fully exposed to the rays of the sun, for it exerts a wonderful influence in giving darker hues to the leaves and painting the flowers with deeper tints. I prefer the parallelogram to any other form, unless some peculiarity of surroundings otherwise determines. But after the location has already been decided on, then all weeds, briars and brambles should be thoroughly eradicated and the surface broken and seeded to bluegrass, which serves to bind and hold the soil. It also retains its freshness more certainly than any other grass. If by chance or otherwise any forest trees, such as oaks, elms, sugar maples, cedars or weeping willows should be growing on the location, so much the better, for by nursing, pruning and shaping they may be made a valuable addition to the lawn without incurring any additional expense.

Some lawn makers are opposed to enclosures, but it seems to me that there should be a line drawn somewhere. It should, however, be as light and inconspicuous as possible, so as not to obscure or mar the beauty of the space enclosed. Nothing that is uncouth in appearance, such as rocks, stumps, dead and dying branches, should be tolerated on the lawn.

Much has been written and said in favor of certain kinds of flowers, shrubs and trees for ornamental purposes, but where there is such an endless variety to select from, and such a material difference in tastes, locality and climate, I consider it would be almost unpardonable presumption to recommend particular kinds, save such as grow wild in the locality where the lawn is located.

By all means plant a lawn, for it is difficult to conceive of anything that will insure a greater degree of domestic tranquility than a neat, well-kept lawn. It educates, civilizes, refines and purifies, and lifts our thoughts above the corroding cares of this life to things eternal and that far-away home where flowers never fade.

THE ETHICAL AND PRACTICAL VALUE OF FLOWERS.

By Mrs. G. E. Dugan, Sedalia, Mo.

"So fair, so sweet, withal so sensitive :—
Would that the little flowers were born to live
Conscious of half the pleasure they give ;
That to this mountain daisy's self were known,
The beauty of its star-shaped shadow thrown
On the smooth surface of this naked stone."

—Wordsworth.

Nature, the great mistress of all art, harmoniously blends the ethical with the practical, the crude with the aesthetic, the useful with the beautiful and there is never any clashing of colors, no mistake in tone, the foreground and background unite perfectly to give the wished for effect. We are told that nothing was ever made in vain. A wise incomprehensible purpose controls all existence. Both animal and vegetable life must bow to the supreme law, for He who made the world will guide it, to its ultimate destiny. If this essay gives greater prominence to the ethical and the aesthetic than to the practical side of the question, remember that the ethical comes first, as flowers precede fruit, therefore in the province of nature these are the first consideration.

"There is to me
A daintiness about these early flowers
That touches me like poetry.
They blow out
With such a simple loveliness among
The common herbs of the pastures, and they breathe
Their lives so unobtrusively, like hearts
Whose beatings are too gentle for the world."

You do not mean to say that flowers have a moral value do you? They have an aesthetic value I will grant, but what can a flower do for morality? These words were written by a friend who had seen the title selected for this paper, and it took considerable argument to convince her that these bright messengers coming so sweetly heralded by the singing of birds, and the humming of bees in the balmy springtime, are actual moral influences, uplifting and making happier, and better the souls of such of earth's children as are not so sadly impregnated by sordid ideas as to be impervious to their gentle teachings.

If flowers have no ethical worth, why have flower missions been established in all the principal cities of this country? And why do the refined and noble women of the W. C. T. U. spend their time and money to take floral offerings to the crime-burdened men and women in our penitentiaries? I have known the gift of a pot of pink geranium to make better the condition of a whole row of tenement houses. The sick woman to whom the plant was given insisted on having her room made clean because the lovely flower looked so out of place there amid the gloom and dirt, and her neighbors tidied up their homes because they looked so slovenly by contrast with hers. Then some thoughtful soul distributed along this row a few packets of nasturtium seeds, and the small grassless spots of soil were spaded up and the seeds carefully planted and cultivated. Thus this entire dingy row was metamorphosed by a plant, and a few seeds, until it grew to be a sweet, clean and wholesome place.

If you doubt this, try the experiment some time. Go into the slums of any city carrying with you a bright plant in bloom, present it to the most slovenly woman you happen to see. In a week or two go back and you will find that the slattern has washed both her face and her window panes, and she will greet you with a glad smile and show you proudly that her geranium has a new cluster of buds almost ready to burst into flower. If you had given this woman a tract, she would have thrown it in your face. Had you attempted to preach a sermon to her she might have thrown boiling water over you, but the unobtrusive moral influence of a little flower is irresistible. Therefore do I affirm that the ethical value is the highest and truest value found in the floral world, for this is the value given it by the august power that created loveliness.

One Easter day a mission worker brought into a slum Sunday school a snow white Bermuda lily. The children had never seen anything so beautiful near the reach of their small fingers. One little girl with much soiled hands, put forth a tiny finger to touch one of the fragrant petals, but a shocked expression passed over her face as she observed the contrast between her grimy hands and the pure petals of the lily. Very hurriedly she withdrew her hand and left the room. Soon returning she again put forth her finger and just as quickly drew it back—it was

not yet clean enough. Once more the child left the room, and came back with another layer of dirt removed, but it was not until the third exit and return that she felt convinced that her hands were pure enough to touch that flower. One dainty finger was timidly extended until it merely touched a white petal, and the little one was satisfied. Here was a lesson in cleanliness taught without words. It was purity calling for its own, and the soul of the child understood the demand of the flower, and gave a pure response.

"Innocent child, and snow white flower;
Well are ye paired in your opening hour;
Thus should the pure and the lovely meet.
Stainless with stainless, and sweet with sweet."

—Willis.

A young man recently staggered into a saloon in a western city. He had been on a debauch for hours, his money was gone, he had nothing left to give for the drink he craved, but on the lapel of his coat was a cluster of fragrant white lilies of the valley. The bar tender noticed them and said, "I will give you a glass of whiskey for that bouquet." The young man started quickly, looked down at the flowers, then bursting into tears, sobbed, "My God; Nellie, have I come to this," and rushed away from the place. I regret that the story ends here, for I am sure that we should rejoice to know that the pure, fragrant life of those lovely blossoms had won back a soul to purity and peace.

"A rose," once said Henry Ward Beecher, "is the sweetest thing God ever made, and forgot to put a soul into." But did He forget? Who can declare just what soul force is? The rose lives, its life is a portion of all life, a part of the mysterious soul of the universe. Lowell declares that

"Every clod feels a stir of might.
An instinct within it that reaches, and towers,
And groping above it—blindly, for light
Climbs to a soul in grass and flowers."

—Bryant.

I comprehend this thought and fully appreciate its mysterious significance. Flowers have a mission to perform, a service to render. They teach purity, and love for the beautiful, besides. Do they not fore-

shadow the glory of the resurrection? A tiny petunia seed is put into the ground. How very small it is. One can scarcely see it unless his vision is perfect, but it springs into life, develops strength and beauty, and finally it is covered with exquisite flowers, dainty in coloring and exhaling a sweet, subtle fragrance.

"A seed is not quickened except it die." Shall not we hope to rise from our graves as radiant and glorious as are the flowers of the field in their transformation. Christ said to His disciples, "Ye are of more value than many sparrows," and yet not one of these small creatures falls to the ground unnoticed, and we are seriously bidden to consider the lilies of the field.

Offer to a child before it has been tainted by a knowledge of the commercial spirit, a rose and a gold piece. Which will it choose? Unfailingly will it take the flower. There is kinship between the innocent child and the blossom. Every young, pure soul loves flowers, not some special bloom, but all flowers. The small denizen of the gutter in crowded cities radiates as much at sight of a beautiful blossom as does the pink and white darlings of the country village or farm house. Each new soul that appears on this planet is linked by some strange invisible tie to the floral kingdom. We naturally love flowers, from "the delicate forest flowers, with scented breath, and look so like a smile," to the great red Camelia shining in the gardens of opulence.

The greatest mystery of all the manifold mysteries is not death, it is life. Life, life, everywhere, in the soil, above the soil, in the air, vegetable, and animal life. Ralph Waldo Trine says, "All life is God." Should not we, then, be very careful what we say, and think concerning this mystery?

The ethical value of flowers is determined by all that is highest and best in the nature of man. As we are all in some mysterious manner akin to the flowers, does not a contemplation of their loveliness sometimes cause the most sordid soul to sigh to

"Leave the vain low strife,
That makes men mad:
The tug for wealth and power,
The passions and the cares that wither life.
And waste its little hour."

and go out some where and find a place where mammon is less, and man is infinitely more than he seems to be in this hurrying, crowding, unsatisfactory existence? The growing grass, the fresh, green foliage of the trees and shrubs, above all, the multitudinous variety of beautiful blossoms, have a moral value beyond the power of words to compute. The practical also has its place, and its distinct valuation, but it appeals more to the physical than to the moral part of man's nature. The practical man does not care for the beauty of a flower as beauty merely but regards it for the commercial value of its loveliness. A rose, to him, is so much possible coin. An Easter lily means to his mind fifty cents or one dollar's worth of material comfort. Such flowers as he can not sell he pulls up and destroys. He almost hates them because they have failed to fulfill his sordid ambitions. The ethical man is like a child in that simple spirit which makes him love all flowers. He revels in the beauty and perfume of a clover field as joyously as he does in a conservatory of the choicest exotics. He haunts the places where the wild flowers riot, and joins in their revels. From the time the first violet and spring beauty smile up from the sod until the last purple aster withers on its stem, he is a companion of the field flowers. The difference between the ethical and the practical value of flowers is merely the difference between the spiritual and physical nature of man. The ethical man, as I have said, loves all flowers; the practical man thinks of their commercial value. Nor is it always the florist who does this. It is more likely to be the chemist, the distiller of subtle perfumes, or the practical student of botany who is considering plants solely on account of their medicinal worth. Whatever the practical object, there is always that distance between them which exists between spirit and matter, a strong difference, but a union which makes the one necessary to the other and valueless to this world without the other.

It is the practical man who has discovered the grand possibilities of floral development. The ethical man would have gone on worshipping the rose in its modest, wild state, but would not have dreamed of a Marechal Niel or an American Beauty, but when these glorious roses were evolved it was the ethical man who most exulted over their loveliness, and who was most willing to bankrupt himself to possess them. The Vanderbilt dinner, where twenty thousand dollars was expended for

roses, is a matter of history, but the meanest tramp who meanders aimlessly across our continent has opportunities to enjoy a richer vision of floral loveliness each recurring springtime, free of cost, if he but have the ethical sense to appreciate it. When all the orchards are in bloom, when apple, peach, pear and plum trees are covered with unnumbered millions of fragrant blossoms, what sight could be prettier? Where could be found more delicious perfume?

The beauty-loving soul could here enjoy an ethereal feast besides which the Vanderbilt dinner was nothing.

However, the farmer seldom sees in his blossom-laden trees their real glory, but contents himself with picturing a magnificent yield of fruit, and leaves to the chance aesthetic visitor the joy of the harvests portent.

Nature is too varied to be monotonous, too full of changes to be dull to him who studies her manifold wonders. There is plenty of room in this grand old world for the ethical, the practical, and the aesthetic. Outwardly they may seem to clash, in reality they are perfect chords in creation's harmonious symphonies. I love flowers and have loved them during all my conscious life. I have cultivated them in health and in sickness. I have clung to and cared for them when the doctor bade me throw them all away and there is ever within my soul the plea:

"Give me flowers—fragrant flowers.
Not alone for leisure hours;
Not alone to wear—and toss
Far away unheeding loss;
But to love, to kiss, caress,
Giving care and tenderness;
In my sad and lonely hours
Give me flowers—fragrant flowers."

"Give me flowers while life is here.
Do not wait until the bier
Grimly holds my confined form,
Let me know that hearts are warm,
With love enough to fill the hours
While here I stay—Oh give me flowers.

THE ORNAMENTATION OF RURAL SCHOOLS AND RURAL HOMES.

By J. C. Whitten, Columbia, Mo.

The desirability of more general ornamental planting about our rural buildings needs hardly to be further advocated. So much has been said and written upon this subject in recent years that the usual bareness about the home and school grounds in the country must have, ere this, claimed the attention of every thoughtful person. That such plantings would have great value is, I think, admitted by all. Anything which adds to the attractiveness of the home makes it a better place in which to rear the children who must grow up there. The grateful shade of trees, the beauty of shrubs, vines and flowers adds much to the attractiveness of a place and tends to elevate the taste, inspire the minds, inculcate a love of home among our people. Considered even from a standpoint of dollars and cents these plantings add greatly to the money value of a place. The snug, cosy well-planted home is worth more than the neglected one. I have known a prominent buyer of apples to desire to drive straight by an orchard where the home was going to neglect and where a snarling dog yelped at the gate, despite the fact that the fruit crop there was a good one. The same buyer was attracted by a well-planted home, and gladly paid the highest price for the apples grown there. The fruit looked redder and better there and his feelings were more liberal toward the owner. In every way a judicious amount of care of the home grounds pays.

If it pays to ornament the home grounds, it is even wiser yet to plant about the schools, where so much more of our time is spent, where our education is secured and where our character is so largely molded. The same principles that apply to the ornamentation of the home, apply likewise to the improvement of the school grounds. For this reason if I speak a word in regard to school plantings the same directions may serve him who wishes to do a little gardening about his home.

The reason that most school grounds are bare is not due to the fact that people do not like pretty plantings, but rather because most of us

have not found out how easily and how cheaply the work may be done. We think of landscape gardening as implying rare and expensive plants, lawns which we must not step upon, constant clipping of flower beds and frequent working of mowers, rollers and rakes. As a matter of fact, the planting best adapted to our school grounds is not that sort of thing at all. It should be a simple grouping of our native trees, shrubs, vines and wild flowers such as school children love, and such as they may arrange by noting just how they grow in the fields and woods.

The first consideration should be not to obstruct the play ground. No healthy minded boy wants a bush growing in the way of his base ball grounds, or a flower bed under his feet when he is playing leapfrog; besides, these things would not thrive there if he did. Some gardeners say the most important thing in a well planted place is the green grass lawn. In considering school grounds we will omit this factor. What healthy boy would allow the grass to grow under his feet that way; or who wants him to anyhow? Let the ground be as bare as ball and bat and shinny club usually cause it to be; we are not planting to restrict the boy's rights but to enlarge them.

The first thing we want, is to furnish some shade. What better thing for this than our native trees? The elm, oak and sugar maple are among the best for permanent shade. The soft maple, the boxelder and the sycamore are rapid growers and should be planted among these long lived sorts to afford some shade while they are growing up and then removed when the elms, oaks and sugar maples need the space.

These trees should not obstruct the play grounds, but should be set in groups about the borders and especially at the corners. They should be placed where shade is needed, not where they will be in the way. Small trees or even seeds should be selected for planting. If trees are dug in the woods, they should be no larger than may be carried home in the hand. They may be planted in fall or spring, but never when they are in leaf. As soon as they are dug a wet sack or something of the sort should be wrapped about their roots to prevent their drying out while they are being carried to the place of planting. As the roots are necessarily cut away somewhat in taking the trees up, the side branches above ground should be cut back to correspond with the reduced roots.

Shrubs like our native dogwoods, St. John's wort, burning bush, redbud, June berry, or any others that are pretty, may be planted in masses, close enough together so that they will touch each other, under the trees, in the angles of the building, at the gateway or in the fence corners. Shrubs or bushes should be managed the same as trees in transplanting.

There is need of vines about almost every school building in the land. They may be used to better advantage than any other plants. The outbuildings, usually so unsightly, may become beautiful if heavily covered with vines. They should also be twined about the porches or doorways. The bare fence should be mantled with them, especially on either side of the gateway. The native five leaved ivy, or Virginia creeper, may be used to cover the bare trunks of trees. In the case of brick or stone buildings the wall may be covered with this same vine

The kind of vine to select depends upon the purpose it is to serve. The wild grape, the moon seed, the bittersweet and the trumpet creeper climb by twining around a support, and will not cling to a smooth wall, with the exception of the latter, which is both a twiner and a disc tendril climber. The five leaved ivy is also capable of clinging to a smooth wall, and is one of the best vines with which to cover the wall of a house or chimney. The morning glory, which may be grown from seed, is also desirable for certain places. Our woods abound in vines of various sorts that will suit almost any purpose in school grounds. Wild flowers may be added to the planting from time to time. When flowers are mentioned we are apt to think of formal flower beds that obstruct the play grounds and need constant attention. As a matter of fact these beds are not necessary and are often not desirable. The best place for flowers is usually against the back fence, in the unused angles of the buildings or under the trees and shrubs. A small space of ground should be spaded, turning the sod under to kill the grass roots and working the surface fine to receive the flowers.

Our native wild wood flowers are best. The spring beauty anemones, blood root, dog tooth violets, wake ribbons, spring lilies and a host of such plants as grow from bulbs or thickened roots under ground may be transplanted readily when they are in bloom. Care should be taken to dig deep enough to get the bulb and roots. These may be

planted under the shade of trees or shrubs the same as they grow in their native woods. The phlox or Sweet William, the butterfly milkweed, the wild asters, the columbine, the violets and many late bloomers may be transplanted with much certainty of their living, at almost any time of year.

The best effect is obtained by planting the wild flowers in masses. The taller ones may be set in the rear and the shorter ones in front, where they will be seen. None where they grow in nature, and plant in shade or sunlight, to correspond to the situation they were found in. The same thing should be noted in regard to whether they like wet or dry places, and whether they are found in a northern or southern exposure. In fact imitate nature in arranging them, not only in respect to location but also in planting in masses.

I have particularly advocated the use of the wild flowers for two reasons. First, they are among our prettiest plants, and second, they will thrive without much cultivation, which can not at all times be given in school grounds. Now that school gardens are being advocated, there is no objection to planting the cultivated flowers or even vegetables to use in obtaining a better knowledge of plant life.

I believe our wild plants will prove the most satisfactory, however, and that the study of the natural situation in which they occur, in order to place them in similar surroundings is one of the best means of becoming better acquainted with plant life. This very acquaintance, which will be enlarged as the student learns to love plants better, will serve not only to improve the tastes and the mind, but will enable the boy or girl who follows it up to better manage the farm crops of the orchards and gardens at home. I wonder how many of the pupils and teachers who read this, will begin the coming spring to spend a part of their holidays and evenings after school in starting a planting about the school grounds or the home.

FIFTH SESSION—Thursday Morning.

Business meeting.

REPORT OF COMMITTEE ON FLOWERS.

To the Officers and members of the Missouri State Horticultural Society:

Your committee on flowers and decorations would respectfully report as follows:

We congratulate the committee on arrangements upon the beautiful decorations of the hall, especially upon the collection of native ferns, tame grasses and flowers. To this committee we would recommend the award of the sum of \$10, to be used as they see fit.

We would further recommend the award of the sum of \$1 to each of the following for the plants and flowers exhibited by them: Mrs. E. L. Parker, Mrs. Wm. G. Rice, Mrs. L. L. Allen, Professor J. T. Stinson, Mrs. A. M. Chandler, Mrs. Charles Hellweg, Mrs. J. F. Wicks, Mrs. A. L. Gates, Mrs. J. A. Legrand. Mrs. L. A. Chapman.

Respectfully submitted,

J. C. WHITTEN,
JAMES M. IRVINE,

REPORT OF COMMITTEE ON FRUITS.

Mrs. Neal Kelley, Peirce City— Dish Dyelhouse cherry.....	\$.25
R. H. George, Peirce City— Two boxes Brandywine strawberries.....	.50
A. Nelson, Lebanon— One box Gandy strawberries25
M. P. Glasford, Peirce City— One box Gandy strawberries..... Two boxes Kansas raspberries..... Two boxes Early Richmond cherries..... One box June berries..... One box Houghton gooseberries..... One box Red Dutch currants.....	1.50
E. L. Parker, Peirce City— Three boxes raspberries..... Three boxes currants	1.50
Fisher & Allen, Peirce City— One crate Wolverton strawberries.....	1.00
J. H. Monsees, Beaman— Two New Seedling strawberries.....	1.50
Conrad Hartzell, St. Joseph— Fourteen varieties plates old apples, one to five years, kept by Hartzell's plan.....	2.00
D. S. Helvern, Mammoth Springs, Ark.— One box Hopkins raspberries..... One box Early Harvest..... One box Golden Queen..... One box Turner..... One box Morrello cherry..... One box Gandy.....	1.50
A. E. Carmady, Peirce City— Three frames honey.....	.50
C. W. Gillham, Peirce City— Three frames honey.....	.50
John Ledd, Peirce City— Four boxes Gandy strawberries.....	1.00
H. R. Wayman, Princeton— One box Wilson..... One box Lovett..... One box Crescent..... One box Epping..... One box Warfield..... One box Brandywine..... One box Capt. Jack..... One box Bisel.....	2.00
A. Gates, Peirce City— Fine head cabbage..... Early Ohio potatoes.....	.25
R. F. George, Peirce City— Two boxes Gandy..... Two boxes Early Richmond..... One box Progress raspberry..... One box currants	1.50
Wm. Bockins, Peirce City— Potatoes.....	.25
J. A. LeGrand, Peirce City— Potatoes.....	.25

We also find specimens of strawberries on the stem exhibited by H. R. Wayman. Varieties: Gandy, Dew, Princeton Chief, Shuckless, Robinson and Marguerite.

Respectfully submitted,

J. C. EVANS,
J. T. STINSON,
F. H. SPEAKMAN.

REPORT OF COMMITTEE ON CANNED GOODS.

Mrs. Neal Kelley, Peirce City—	
One quart cherries.....	
One quart each strawberry, Concord and white grape wine.....	.85
Mrs. E. Forsythe, Peirce City—	
One quart strawberry jam.....	
One quart gooseberry jam.....	.15
Mrs. E. L. Jerome, Peirce City—	
One glass jelly.....	
One quart strawberry.....	
One quart cherry.....	.25
Mrs. McReynolds, Peirce City—	
One quart peaches.....	
One quart tomato pickle.....	.25
Mrs. G. R. Armstrong, Peirce City—	
One quart strawberry jam.....	.15
Mrs. G. V. Kline, Peirce City—	
One glass strawberry jam.....	
One can strawberry.....	
One glass strawberry jelly.....	.85
Mrs. R. F. George, Peirce City—	
One quart strawberries.....	
One quart cherries with stems.....	
One quart cherries, seedless.....	
One quart strawberry jam.....	
One glass cherry preserves.....	
One glass strawberry preserves.....	
One glass strawberry jelly.....	
One glass currant jelly.....	1.00
Mrs. Ray Taylor, Peirce City—	
One glass strawberry jelly.....	.10
Mrs. C. A. Fisher, Peirce City—	
One quart rhubarb.....	
One quart cherries.....	
One quart strawberries.....	.40
Mrs. Gates, Peirce City—	
One quart peach preserves.....	
One quart peaches, canned.....	
One quart quinces, canned.....	
One quart sweet pickles.....	
One pint strawberry preserves.....	
One pint strawberries, canned.....	
One pint huckleberry.....	
One pint cherries.....	
One pint blackberry.....	
One pint spiced tomato pickles.....	
One bottle unfermented strawberry wine.....	
One bottle unfermented grape wine.....	
One bottle unfermented raspberry wine.....	2.25
Mrs. Holloway, Peirce City—	
One quart cherry.....	
One quart gooseberry.....	.25
Miss L. Murtfeldt, Kirkwood—	
Two sample Seedling strawberries.....	1.00
Mrs. Chambers, Peirce City—	
One quart preserved tomatoes.....	
One quart peaches.....	
One quart pears.....	
One quart gooseberries.....	
One quart tomatoes.....	
One quart cucumber pickle.....	
One quart white pears.....	
One pint watermelon preserves.....	
One pint strawberry jam.....	
One pint grape jam.....	
One pint Damson plum preserves.....	1.50

REPORT OF COMMITTEE ON CANNED GOODS—Continued.

Mrs. L. A. George, Peirce City—	
One quart strawberry.....	
One quart strawberry jam.....	
One quart tomatoes.....	
One quart rhubarb.....	.50
Mrs. French, Peirce City—	
One pint strawberry.....	
One glass jelly.....	
One quart gooseberries.....	.25
Mrs. J. E. Coppock, Peirce City—	
One glass raspberry jelly.....	
One glass grape jelly.....	
One glass strawberry jelly.....	
One glass blackberry jelly.....	
One glass plum jelly.....	.75
Mrs. L. L. Allen, Peirce City—	
One quart gooseberries.....	.15
Mrs. Eckert—	
Two cans peaches.....	
One can cherries.....	.45

Respectfully submitted,

W. A. IRVINE,
MRS. A. NELSON,
MISS A. MURTFELDT.

REPORT OF COMMITTEE ON OBITUARY.

To Officers and Members of Missouri State Horticultural Society:

Since our last meeting two members of this society have passed from this life into the life of the great hereafter.

Henry Speer of Bates county was deeply interested in horticultural work. He never neglected an opportunity to advance its interest either in the local work of his own county or at meetings of state societies. He was for ten years the secretary of the Bates County Horticultural Society. He gave much time and personal attention to the collection of fruits for exhibitions to advance the merits of his own county and state.

L. Geiger of Boonville lived out more than his allotted three score years and ten. He gave much of his active life to horticultural pursuits, more especially in grape culture. Ever ready to disseminate his

knowledge and experience to his local society, and at state meetings his presence and practical talks were inspiring and assisted very much in encouraging our workers to go forward in our noble calling.

Resolved, that in the loss of these two brothers, this society has been deprived of two useful members and the state of two valuable citizens.

Resolved, that this society deeply sympathizes with their bereaved families and that the secretary furnish them with a copy of these resolutions, and that a copy be spread upon the records of this association.

J. HENSLEY, Springfield, Mo.

J. H. MONSEES,

C. I. ROBORDS,

Committee.

COUNTY FRUIT REPORTS.

J. Hensley, Greene County.—Strawberry harvest is now over. There are no peaches and few trees left. Wild goose plum is fair, others have but little fruit. Cherries have dropped; Early Richmond having one-half and Morello one-third of crop. Large apple orchards show Ingram in excellent condition. Maiden Blush and Huntsman fair. Ben Davis is peculiar, some trees have no apples, some a few, some a fair showing. The general estimate is for a quarter of a crop. In the old orchard trees are dying; in the brag orchards great care and cultivation was given, yet the trees are dying. Cherries are blighting, especially the tops. Of pears we have a few of Keiffer, more than was supposed two weeks ago. In some yards Bartlett and Duchess are found comparatively full.

W. A. Irvine, Greene County.—Ben Davis will not have a tenth of a crop, and if there is twenty-five per cent all round we shall do well. Dyehouse cherries are full and Richmond fair. The Hazeltine orchard out of Springfield is dying because of drouth. The trees were breaking with fruit at the time, so the result was bad; three-fourths of the apples should have been removed.

M. Butterfield, Jackson County.—Ben Davis on twelve and fifteen year old trees will have a fair crop; younger ones only about a sixth. Gano is about the same. Jackson county will have about a sixth of a full crop.

I. B. Lawton, Benton County, Ark.—There will be no peaches, but our trees are not hurt. Pears will be fair crop. Strawberries immense, raspberries will be short because of the winter.

C. J. Eld, Benton County, Ark.—Some parts will have a full crop of Ben Davis, some not nearly that. Ingram are full of nice fruit. Ben Davis apples are poor. Western part of the county have a very good report, the eastern much less.

Wm. H. Barnes, Topeka, Kan.—Early bloom gave fine promise, but less since. Report for western Kansas is that apples are falling. Jonathan is a failure. Apples now promise twenty-five per cent of a crop of winter varieties, but we hope for unusually good quality. Spraying seems to be unnecessary this spring. Pear report is good. Cherries, medium; strawberries, good, but prices low, still growers are planting extensively.

E. B. Utter, Barry County.—Early fruit is full. Fall trees are full. Winesap is fair, Missouri Pippin is very full, Ben Davis has enough, Limbertwig is full. The general report is twenty-five per cent of a winter crop.

J. C. Evans.—My actual observation is that the apple crop of Missouri will not be over twenty-five per cent. The early varieties have more than the winter ones.

J. M. Irvine, Buchanan County.—There was not a full blossoming, but they set well and the general promise for the first of June is fifty per cent. Missouri Pippin comes first, Winesap, second, Ben Davis is short; others will not have a tenth of a crop.

N. F. Murray, Holt, County.—Strawberry crop is good; raspberry, ten per cent; pears are few, also plums, and I have counted six peaches. Apples average twenty-five per cent with Winesap short. Ben Davis heaviest, but not over twenty-five per cent.

D. S. Helvern, Benton County, Ark.—Plums will be twenty-five per cent. Old Ben Davis about forty; raspberries, twenty-five; black-

berry, seventy-five; pears, twenty-five. Black Twig and Minkler not more than ten; grapes will be full.

Levi Chubbuck, St. Louis.—Peach reports are for a small crop; one orchard has one-third of the trees which promise a half crop.

F. E. Atwood, Carroll County.—Winter apples will give us a third of a crop; pears are fair, cherries a fourth of a crop. Peaches, blackberries and raspberries, none; strawberries will be plentiful.

Mrs. A. Z. Moore, Cedar Gap.—Southwest Wright county will have fifty per cent of an apple crop. Southeast, full sixty per cent. Small orchards through the lower part are full. Texas county reports sixty per cent from her small orchards. There are no Ben Davis, no pears, no peaches and no cherries. Grapes will give us half a crop.

H. S. Wayman, Mercer County.—Apple prospect is for twenty-five per cent. Willowtwig is the best at sixty per cent. Strawberries are full, hardy small fruits are fair. Pears, plums and cherries will be about half.

G. A. Atwood for Webster County.—Four hundred and fifty thousand apple trees have one-half crop of Ben Davis.

A. Nelson.—Fruit growers from Webster county report a fourth of a crop of winter apples. Reliable information from seventy-five miles is for not over twenty-five per cent; if the scab comes it will be less.

Sarcoxie.—This week will end Sarcoxie's berry harvest. There have been reports published that our berry crop was a complete failure and prices so ruinous that our growers would quit the business, but such reports are purely fake and will not stand investigation. It is true that the heavy rainfall during the time the plants were in blossom cut the crop short of what had been expected and injured the quality of the berries, but when anyone says the growers are ruined, it is not true. We are informed that the returns so far received by the Horticultural Association show \$1.06 per crate for the combined grades, A., B. and X. Berries have been selling for better prices during the past week and \$2 was the quotation for good berries on Monday, so there should be no reason for the net average being below \$1 per crate for this season. The Horticultural Association has shipped about ninety-five cars and the Gandy growers about thirty-two cars to date and the total shipment will no doubt reach 130 car loads, exclusive of the express shipments for this season.

Taking 130 cars for an estimate of this season's crop, \$1.06 per crate net would mean an approximate profit of forty-six cents per crate for the grower. Counting 100 crates to the acre at forty-six cents, would mean \$46 per acre. Who can make that much per acre growing wheat and corn? A profit of forty-six cents per crate would mean a profit of \$35,880 to the growers and \$28,080 to the pickers, much of which has been left with our merchants and other business men. Does that look ruinous? It beats last year's crop by about fifty per cent. Considering the crop and its condition, the berry growers of Sarcxie can consider themselves fortunate; for they have realized, in many instances far more than their berries were actually worth. Less berries and better ones should be their motto for the future.

SECRETARY'S REPORT.

Members and friends of Horticulture:

I thought on my trip down here from Kansas City it could hardly be possible to have a more beautiful country than the rolling prairies, the little wooded copse and the strips of timber along the streams and around the springs. I looked farther and beautiful fields of meadow, of wheat, of corn, of oats, and of pasture filled with thousands of cattle, of horses, of mules, of hogs, of sheep, and it seemed as if this great west could feed the world. I then, in imagination, looked into the many happy homes surrounded with neither poverty nor wealth, but with plenty, plenty of work to keep men busy, plenty of beauty to make men happy, plenty to eat, to wear, to enjoy, plenty of time to be called his own, and I thought if it were only possible for these men to appreciate the position they occupy, their freedom from care and worry like the city merchant, or manufacturer, or trader, or railroad man, or even the lawyers and doctors, that if any people in all this great west should be happy and enlightened, and progressive and patriotic, these were the people. Methought myself a king before whom all this grandure of hills and valleys, prairie and timber, houses and lands, fields and flocks, gardens and orchards, were spread out to enjoy. I saw beyond all this

all the cities of the plain, all the railroads, all the trains we saw in passing, all the great mines of coal and lead and zinc, all the thousands at work that I might enjoy this wonderful beauty and I thought myself a king with freedom to go and come as I pleased, to visit this city and that country to call upon whomsoever I wished to do my bidding as we rolled along over these beautiful lands which God has prepared for man's habitation. Again I looked and all the beauty of the firmament above us, all the beauty of the sky and cloud, of sunlight and sunshine, all for me to enjoy and I thought myself a king.

And not only myself but every other man on this broad land of ours is a king likewise, a king for whom all these things are made, a king capable of enjoying all these gifts of God if he will; and I thought how happy this nation of kings and queens should be with all these things at this call. Surely America should be, and ought to be, a great nation when all are kings.

Did it ever occur to you that all the best things of this world, as well as the world to come, are free for all of us. The air we breath, the water we drink, the rain and dew and sunshine and storm, the beauties of the field and landscape, the glory of the heavens above us, and the grandure of the earth beneath us. The happiness of home and friends, the love of our neighbors, things that are free to all who will take them, like the gift of God, of eternal life to everyone who is willing to accept. All these great gifts and beauties are ours if we will only make them ours. And so I thought if I could only write what I saw and know and understood I would let others know as well, but I could not.

A DAY OF JUNE.

I could write such a beautiful poem
About this summer day,
If my pen could catch the beauty
On every leaf and spray,
And the music all about me
Of brook and breeze and birds—
But the greatest poet living
Can not put them into words.
So I may not write down the poem
As it came from the hand of God
In the wonderful wordless language
He writes on sky and sod,

In words that we tell *our* thoughts in,
That will make you feel and see
The beautiful, beautiful poem
This day has been to me.

If I might, you would hear all through it
The melody of the breeze,
Like a fine and far-off echo
Of the ocean harmonies:
You would hear the song of the robins
Aswing in the apple tree,
And the voices of running waters
In their search for the great gray sea.

You would breathe the fragrance of clover
In the words of every line,
And incense out of the censers
Of hillside larch and pine;
You would see through the words the roses,
With, deep in their hearts of gold,
The sweets of a thousand summers—
But words are so weak, so cold!

If I only could write the color
Of the lilac's tossing plumes,
And make you feel, in a sentence,
The spell of its sweet perfumes;
If my pen could paint the glory
Of the blue and tender sky
And the peace that crowns the mountains,
My poem would never die!

—Eben E. Rexford in *American Garden*.

THE OUTLOOK.

Since last we met at Columbia, we have seen what destruction has been caused to many of our fruit and nursery plantations by one of the icy blasts of winter. This severe cold coming after the great drouth of 1897, and the superabundant growth of 1898. soft and immature, followed by a warm and moist fall, has caused greater damage and destruction to our fruit interests than have all other causes together for many years. At this time we see that the end is not yet, and fear that many of our trees will yet die from its effects.

The great bugaboo of too many trees and over-production will help to settle itself as to our orchards. It would seem that we are passing through a series of extremes of hot and cold, and wet and dry; may it

soon speed the day when normal times and seasons shall once more have their sway.

The obstacles we overcome help to make men of us, and perhaps it may be that these series of reverses will be the opening of some new thought and new work and new experiments in regard to hardiness and productiveness among our fruit plantations. It has been a series of surprises to most of us, how it has damaged the apple in many places much more than the peach. How it is that the peach has not been killed in the root, while many apples have been entirely lost. I wonder when I see the results if it be possible, nay, even if it is not probable, that this winter killing comes from the indiscriminate use of apple seed and seedlings.

In our meeting at Trenton and again at many another meeting, I called particular attention to this matter of the indiscriminate use of all kinds of apple seed for our seedlings. I mention this now because many of our apple trees are dying at the root as a result of the freeze while the top seems to be only slightly injured.

Can we find the cause of this showing plainly? I believe we can. To-day we see that many of our trees have only live roots coming from above the graft. The root below the graft has decayed, rotted off many times, and the top roots from the tree itself seem still sound. This holds true, it matters not if it be grafted on piece-root, long-root, whole-root or short-root. This length of root used in grafting has nothing to do with the life of the tree, but the kind of seed used, the kind of root used, have all to do with the life of the tree.

The whole trouble comes, in my honest opinion, in the kind of seed used. Our seed has come from all kinds of apples, the very poorest and most immature in our orchards, those used for cider and vinegar, and these seed can not produce good stocks to graft upon. What is more, the French seed is worse for us to use, for they save poorer fruit even than do we Americans, and their trees are not as hardy here in America.

The caution uttered time and again in my report to you I wish to much more emphasize at this time and now only call your attention to the careful selection of the seed. Perfect apples of hardy varieties, from sound trees, carefully selected, will give us the foundation to work upon. We used to save perfect specimens of certain varieties, and then

plant only the best seed from these specimens. These seedlings had then to stand in the nursery row for three years before grafting. Many of these seedlings were by this time discarded as unfit for grafting, and only the very best were then used. Can you not see that such a plan would insure a good, hardy, healthy root and likely give a good tree. If this icy blast of last February teaches us this lesson it will be a blessing in the end to the fruit growers.

The School of Horticulture at Columbia has kept on its way and is doing a grand, good work for the intelligent solution of the fruit industry of Missouri. I want here to again give the hearty indorsement, as this society has often done, to this school for the young people of our land. The Agricultural College has put into motion one of the greatest helpers to the farmer, in these schools it has established; it teaches the young men and women how to think for themselves.

If I can only impress upon every member of this society the advantages of this school and that it fully meets the requirements of the farmer, I am sure you would one and all make yourselves a committee urging our young people to go there.

COMMITTEE ON HORTICULTURE.

Another step in this direction is the work of this committee on Horticulture. At the meeting of the executive committee on May 2, it was decided that this committee be called together here to discuss this matter and if possible to outline some plan for the best presentation of the subject to our teachers and schools. The subject is being discussed all over our land and now it is no more "shall it be done," but "how shall it be done?" This meeting will be the place for a full discussion and we hope to see some outline discussed, referred to the State Teachers' Association and then fully formulated at least in time for our winter meeting. It is not necessary for me to discuss here now the advantages or the necessity of this work, for we have passed by that stage, but we do want

to know how best to do it and we do not want to make any blunder in this matter.

Our medals are at last in our hands. Only the other day were they secured from Jefferson City and taken to Kansas City, there to be engraved and are now ready for distribution. I have them here and shall send them from this meeting to the proper owners. The delay has been caused because our commissioner thought best to have them on exhibition at Jefferson City while the legislature was in session. The wonderful awards gained by Missouri at Omaha are beginning already to bear fruit in the hundreds of people daily looking for homes among us. I think that these exhibitions bring our state into prominence and are the means of bringing more people to our state than most people realize.

This brings to our notice at this time other opportunities in this same direction. At Detroit in 1900, Buffalo, 1901, St. Louis, 1903, we must again make this same effort to let the people see what we are doing and can do. The St. Louis Exposition also are to-day asking us to make the display in their building this fall. It means lots of work and lots of time spent if we do so.

Our report has been published and sent out somewhat earlier than usual and has been well received. Never a day passes but that we have to mail a number of them, and often calls are made for back years' reports or a file of them as far back as we can supply.

We are glad that we have so many efficient workers and willing helpers in all we have to do and that this work is growing in such a remarkable way. These reports show to the outside world that we are alive and at work and know what to do.

The appropriation for the next two years will be the same as the last, thanks to the timely visit of some of our workers just at the right time. Our legislature in its cutting off expense accounts sought to curtail our printing bill, but when the matter was explained to the appropriation committee they at once restored the original amount so that we may have our usual 4,000 copies at least.

The transportation problem is an ever present one before us, and the proper distribution of our fruits must be finally determined before we

can profitably have the large plantations of strawberries so numerous as they are at present. This matter of over-production will adjust itself when these others are settled properly. There is no doubt but that there were too many berries on the market in some of our markets at one time this year to pay the grower anything. Sixty car loads from one point in one day will soon fill every market in the west to overflowing. In this great rush for the business by these commission men we find so many unprincipled men who lie so easily and so well, that they get the cars often when they know their houses can not handle them, and at the same time there are hundreds of small towns where there are none. Six cars secured by the solicitors of one house in Minneapolis in one day was a slaughter of the prices, it could be nothing else. Car loads are all right but if the grower gets nothing, the business soon stops. Shipments to our smaller towns must be made to help us out of this trouble.

If the express companies will take upon themselves this question of distribution and good markets and good dealers, then they will not only help the grower out of their trouble but make money for themselves. The companies have all the agents and means at their disposal for its solution and they must take hold of it in earnest. This, and the other fact that all these goods should be sold at the point of shipment, which should be put into practice, will soon settle this serious question. It is much better, in case of a glut, to sell crates of berries for twenty-five cents per crate at the station, than it is to sell in Omaha or Minneapolis or Detroit, is it not? But this question will come up in its proper place, for presentation and discussion, and I trust we will take hold of it and help to settle it.

THE NURSERY MENS' ASSOCIATION.

The Nursery Mens' Association meets in Chicago next week and, in this serious time with our nursery trees, we should have some of our members attend. The trouble and damage to our nurseries should be well known for we will all be wanting trees for the next few years, if ever. It will take three years' planting and replanting to replace all the trees that are dead and will yet die from the effects of the severe cold.

The American Pomological Society holds its meeting in September in Philadelphia, when half rates can be had to the sessions. It has always been our plan to send some one to these meetings and to make a display at that time. We have won many a medal for our society and for her members at these displays and we must still continue to do so, even if it means much work.

And now, dear friends, meeting here in this beautiful city where comfort and plenty surround you, where the land produces the best of all products and fruits, we have had the pleasure of each others' advice, and experience and association, and in the hall so beautifully decorated by skillful hands we feel as if we were of one family and one household. We have outlined only a very small part of the work that is before us and of experiments to carry out, so that you may know a little of the results this society is seeking to accomplish. The one great secret of our success as a society has been and ever will be the united action and assistance every member of this society has been willing to give to all the work which has come before it. May it ever be our motto.

L. A. GOODMAN, Sec.

REPORT OF TREASURER A. NELSON.

June 8. 1899.

		<i>Amount Received.</i>		
1898.				
Dec. 26	Balance on hand.	\$	250 85	
1899.				
Jan.	Cash from State Auditor	\$	1,150 31	
March	Refund from Hudson & K.		33 00	
June	Membership, L. A. Goodman		28 00	
June	Membership, A. Nelson		8 00	
				\$ 1,465 16
		<i>Amount Paid Out.</i>		
Jan. 16	W. G. Gano, Delegate to Nebraska State Society	\$	19 10	
	H. E. Van Deman, Expense from Washington.		19 20	
	Warrant No. 417			\$ 38 30
Jan. 31	P. O. Bill \$90.18: Express, \$8.40.	\$	33 58	
	Salary of Secretary for January		66 66	
	Salary of Typewriter		20 00	
	L. A. Goodman's trip to Jefferson City and hotel.		10 55	
	Warrant No. 418.			\$ 130 79

REPORT OF TREASURER—Continued.

Feb. 28	Express, \$5.55, \$4.65; Dray, \$1.80, \$1.15	\$ 12 65	
	Scotford Print, P. O. Cards.....	5 75	
	Salary of Secretary for February	66 66	
	Salary of Typewriter	20 00	
	Warrant No. 419		\$ 105 06
March 18	P. O. Bill, \$24.29; Express, \$1.15.....	\$ 25 44	
	Scotford Print, 1500 circulars, \$5; ink and stationery, \$2.30.....	7 20	
	Salary of Secretary for March	66 66	
	Salary of Typewriter	20 00	
	Warrant No. 420		\$ 119 30
March 29	Express	\$ 1 30	
	Trip of J. C. Evans and L. A. Goodman to Jefferson City; and hotel.	15 10	
	Warrant No. 421.		\$ 15 40
April 24	E. W. Stephens: Binding 1,000 Reports.....	\$ 150 00	
	500 labels, \$2; freight to Jeff City, \$4.20.....	6 20	
	1100 wrappers, \$3; boxing, \$15	18 00	
	Express on Reports	125 84	
	Warrant No. 422		\$ 300 04
April 29	Freight on Reports, \$10.80, \$11.68; P. O. Bill, \$72.26.....	\$ 94 74	
	Salary of Secretary for April.....	66 66	
	Salary of Typewriter	20 00	
	Hudson & Kimberly, Printing and Etchings.....	8 60	
	Warrant No. 423		\$ 190 00
May 2	Expense N. F. Murray to meeting Ex. Com.....	\$ 6 06	
	Expense A. Nelson to meeting Ex. Com.....	18 40	
	Warrant No. 424		\$ 24 45
May 29	P. O. Bill, \$24.59; Scotford, 2,000 programs, \$13.75.....	\$ 38 34	
	Salary of Secretary for May.....	66 66	
	Salary of Typewriter, \$20; Express, .55	20 55	
	Warrant No. 425		\$ 125 55
June 3	P. O. Bill.....	\$ 50 10	
	Warrant No. 426		\$ 50 10
June 9	G. B. Lamm, Trip to Jefferson City.....	\$ 6 40	
	G. B. Lamm, Trip to Kansas City.....	6 15	
	Printing bill, \$23; postage, \$13.80	36 80	
	Warrant No. 427		\$ 49 35
June 9	Premiums at summer meeting	\$ 47 20	
	Expenses N. F. Murray, summer meeting	15 50	
	Expenses D. A. Robnett, summer meeting	15 00	
	Expenses Misses Murtfeldt, summer meeting	22 00	
	Expenses W. J. Stevens, summer meeting	2 50	
	Warrant No. 428		\$ 102 20
June 9	Expenses G. B. Lamm, summer meeting	\$ 4 50	
	Expenses A. Nelson, summer meeting	8 00	
	Expenses J. C. Evans, summer meeting	5 00	
	Expenses L. A. Goodman, summer meeting	14 50	
	Hotel Bills at June meeting	35 25	
	Warrant No. 429		\$ 67 25
June 9	J. C. Evans, expense to Peirce City in February.....	\$ 11 25	
	J. C. Evans, expense to Jefferson City in April.....	2 50	
	A. Nelson, stamps and telegrams.....	3 17	
	Warrant No. 430		\$ 16 92
June 9	F. P. Burnap Stationery & Printing Co	\$ 114 50	
	Warrant No. 431.....		\$ 114 50
	Total Receipts.....	\$ 1,465 16	
	Total Paid Out.....	1,450 21	
	Balance on hand		\$ 14 95

A. NELSON, Treasurer.

MEMBERSHIP BY L. A. GOODMAN.

Dec. 27, 1898	G. T. Odar.....	Holt, Mo.	\$ 1 00
Dec. 29	J. L. Jamison.....	Sledd, Mo.	1 00
Jan. 4, 1899	A. A. Blumer.....	Fredericktown, Mo.	1 00
Jan. 11	A. H. Gilkeson.....	Warrensburg.	1 00
Jan. 16	N. B. Rice.....	Chicago, Ill.	1 00
Feb. 23	Ferd Fleischner.....	Gasconade, Mo.	2 00
Feb. 23	F. P. Halsey.....	St. Joseph, Mo.	1 00
March 2	H. T. Williams.....	Ozark, Ark.	1 00
March 4	A. B. Combs.....	Ft. Scott, Kan.	3 00
March 8	C. J. Trowbridge.....	Kansas City.....	1 00
March 10	W. G. Swing.....	Chicago.....	1 00
March 14	M. B. Jolly.....	Trenton.....	1 00
March 30	C. W. Oppinlander.....	Richview, Ill.	1 00
April 3	E. C. L. Larch.....	Savannah, Mo.	1 00
April 7	D. W. Reid.....	Slater.....	1 00
April 21	W. J. Stevens.....	Carthage.....	1 00
May 6	Th. Brownlee.....	Willow Springs.	1 00
May 22	N. R. White.....	Napton.....	1 00
May 26	A. A. Spickerman.....	Maryville.....	1 00
May 31	Wm. P. Parmenter.....	Hamilton.....	1 00
June 2	\$ 23 00

LIST OF MEMBERS PAYING ANNUAL DUES TO A. NELSON.

Peirce City, June 8, 1899.

1—I. B. Lawton, Bentonville, Ark.....	\$ 1 00
2—Geo. Bill, Bentonville, Ark.....	1 00
3—Hy. Wallis, Wellston, Mo.....	1 00
4—H. S. Wayman, Princeton, Mo.....	1 00
5—W. J. Stevens, Carthage, Mo.....	1 00
6—F. H. Speakman, Neosho, Mo.....	1 00
7—S. Kauffman, Thayer, Mo.....	1 00
8—J. T. Stinson, Fayetteville, Ark.....	1 00
	\$ 8 00

We your committe on finance have examined the report and accounts of your treasurer, A. Nelson, and find all correct, receipted bills accompanying each and every voucher.

JOHN T. SNODGRASS,
R. J. BAGLY,
GEO. T. TIPPIN.

Peirce City, Mo., June 9, 1899.

Committee.

REPORT OF COMMITTEE ON AGRICULTURE IN SCHOOLS.

By W. J. Stevens, Carthage, Mo.

CHANGE OF NAME.

The committee believe that instead of discussing the subject or horticulture, their statements and recommendations should be designated

"Agriculture in Schools." We believe that it would be narrow to confine ourselves to a discussion of horticulture alone. The great subject is agriculture, of which horticulture is a part. We should take the broad view and endeavor to carry into the schools the teaching of the underlying principles of agriculture.

CONSERVATISM RECOMMENDED.

The committee believe that it will take many years to bring about the systematic instruction in agriculture which they would like to see. They realize that among the great difficulties in the way of its early introduction into the elementary schools are the deep seated prejudice against what is termed "book farming," and the lack of teachers prepared to give even the elementary instruction here recommended. They believe, however, that a beginning should be made. In suggestions given as to methods of instruction, the attempt has been made to outline a method which may be followed as a whole or in part. Any part of the instruction suggested, if given in the proper manner, will tend to make the pupil more observant and intelligent. It will better fit him to understand and appreciate the vocation of agriculture which in the highest degree determines our national prosperity.

PREPARATION OF TEACHERS.

Persons who have taken a course of study by the laboratory method, in biology, botany, physics, or chemistry in any good high school should be able to give part of the instruction here recommended. If they have studied several of these sciences in a high school, or if they have studied them in any of the state normal schools, in a good college or university their preparation will be better. The short course in agriculture and horticulture offered during the winter, or the special summer course in agriculture and horticulture offered at the Missouri State University is the best special preparation that a teacher may make in a limited time. Those who have had no laboratory work in any of the sciences will hardly make a success in teaching elements of agriculture as hereafter recommended.

AVAILABLE PUBLICATIONS.

Numerous books have been published giving suggestions in nature study, observations of plants and animals. These will give valuable suggestions to an enthusiastic teacher. It would be a mistake for a teacher to follow any one of these books except as the suggestions given apply to the local environment.

The experiment station of the Missouri State University from time to time issues bulletins giving the results of experiments, and the method of conducting these experiments. The Department of Agriculture of the national government has already issued nearly one hundred valuable "Farmer's Bulletins" and issues several numbers every year. These together with the Experiment Station Records, sent out by the Department of Agriculture, give the latest discoveries, the latest scientific information, and the reports of progress made in every department of agriculture. Any one may obtain these publications at a trifling cost. Many of them are sent free to applicants. Every intelligent farmer should procure and carefully read the publications treating of subjects in which he is specially interested. Every teacher will be better able to teach geography and the elements of agriculture after having read any of these publications.

Children in the rural schools should acquire the knowledge indispensable for reading these publications, or any book on modern agriculture, or for attending with profit farmers' institutes and meetings of horticultural societies. As useful aids in pursuing the general subject of agriculture may be mentioned: King's "The Soil," and "Goff's Principles of Plant Culture." To the student of horticulture the following books by L. H. Bailey, may be found useful: "The Nursery Book," "Fruit Growing," "Plant Breeding."

OBJECTS.

The study of the underlying principles of agriculture should inspire pupils with the love of country life and the desire not to change it for city or town life. It should inculcate the truth that the agricultural profession—the most independent of all professions—is more remunerative than many others for industrious, intelligent and well instructed followers. It should inculcate in the minds of pupils an appreciation of

truth in its broadest sense; an appreciation of exact observation, an exact expression of truths observed and a correct analysis of these truths. While a boy may be able to distinguish between a pear tree and an apple tree he can not name the distinguishing characters upon which he bases this knowledge. While he may be able to select a beef animal from a dairy animal he can not tell in what particular points they differ, so as to impart this knowledge to another.

TIME REQUIRED.

It is recommended that the study of agriculture be not added to the already crowded courses of study in the public schools. It is suggested that a part of the time usually given to geography be devoted to the elements of agriculture. A quite general belief prevails that much of the so-called "geography" could be left out of our schools with little loss to the children. Instead of memorizing facts about distant lands, which are of such little interest that the child tries to remember them only until the examinations have been passed, one fifth of the time, or one lesson per week could be given to observation and experimental work in agriculture. This would be an absolute gain to the interest in the geography text-book during the remaining four days. Other subjects may be studied correlatively to aid in preparing children for their future life. Teachers in rural schools should adapt general education to the daily needs of the local population, giving the reading matter, language, and arithmetic a touch of agricultural knowledge. Pastoral poetry, occupations or rural life, problems in the form of simple accounts and referring to the cost of commodities bought and sold in the neighborhood, and the mixtures and proportions of food for stock, may be valuable aids in lessons on agriculture.

METHOD.

Elementary instruction in agriculture should be addressed to the intelligence and observation powers of the children rather than to their memory. The study of plants and flowers should not be confined to books, but should take in nature herself. It must not drift into a mere literary study, or it will quickly fall into disrepute. Instruction should be based upon the observation of daily facts in country life and on simple

experiments, applying material resources at hand, and designed to prove the scientific fundamental ideas of the most important agricultural operations. Children should learn the reason for these operations, with an explanation of the accompanying phenomena.

In no case should a list of precepts, definitions, or agricultural recipes be committed to memory. By the experimental method they should learn the conditions essential for the growth of garden vegetables, the reasons for habitual work in common farming, and the principal hygienic rules for the care of man and animals.

The teacher would pursue a wrong course in the instruction in agriculture, should he only require the children to study and recite from a text-book. Instruction, to be of value, must be by observation and by simple experiment. Only by placing phenomena before them for observation can children be taught to observe and fix in their minds the fundamental ideas upon which modern agricultural science rests.

COURSE OF STUDY.

For children up to the age of nine or ten years, object lessons, continued on the plan practiced in kindergartens, special attention being given to objects from the garden, domestic animals and insects and birds most numerous in the locality.

With older children it is impossible to understand even the simplest phenomena in agriculture without some definite understanding of the three states of matter and the properties of each. A child that does not know air as a material substance, and knows some of its properties can not understand the functions of nutrition and respiration. Experiments showing the displacement of water by air, collecting and measuring gases, preparing oxygen, showing that air contains oxygen can be made at slight expense.

In the fall and winter, animals may be studied. The striking facts in the histories of domestic animals, the varieties of dogs, horses and other domestic animals are of interest.

Comparison of dogs and cats, horses and mules, hens and ducks may be made. The habits of domestic fowls, of migratory birds, the metamorphosis of frogs, the silk worm, bees, all these are subjects full of interest.

Man as an animal, ruling all the others and yet dependent upon other animals and plants, is next to be studied. The description of the body, and the functions of nutrition and respiration should claim attention.

In early spring the attention of the children may be directed to the phenomena of germination and the starting of the stem, the growth of the root and root hairs. Later, flowers should be examined and the names of each of the four whorls learned. A few of the families of plants in the neighborhood may be observed, and their names and characteristics studied.

After these elementary steps have been taken, pupils are able to make simple experiments with soils.

The object up to this point has been to train them to observe and to familiarize them with the technical terms that are in common use.

They will be prepared to learn by intelligent experiment the value of the four great essentials of soil—humus, nitrogen, phosphoric acid and potash. Limestone may be converted into quicklime in the stove. The action of water on quicklime, properties of slacklime, lime water, the reconstruction of limestone from limewater and the carbon dioxide exhaled from the lungs—all these give him ideas of chemical changes.

The mechanical separation of soil into humus, sand, and clay show the physical constitution of soil in a manner easily remembered.

The examinations of different soils in the field and by the road-side, learning that plants, like animals, require nourishment and testing the value of manures when applied to plants growing in poor soils, are next in order.

A knowledge of insects injurious to vegetation together with the best methods of destroying them may be obtained partly by observation and partly from books. Birds that are friends to farmer, gardener, or horticulturist, and that aid him in his warfare against injurious insects, the wisdom of taking legal means to prevent the wanton destruction of his feathered friends, are subjects about which every citizen should be informed.

As long as that beautiful, sweet songster—the insect-eating meadow lark is legally one of the game birds of Missouri, we must acknowledge our inability to distinguish our enemies from our friends.

If the course of experiment and observation here suggested be kept up during the school days of the children in rural schools, they will be able to read with interest the reports of work done at the experiment stations, and will learn to apply what in these reports is valuable for agriculture in their own locality.

Intelligence will contribute to pleasure and profit in the profession of agriculture, and agriculturists will contribute even more largely than heretofore to the ranks of intelligent and enlightened American men and women.

W. J. STEVENS, Chairman.

R. B. D. SIMONSON,

J. C. WHITTEN,

Committee.

REPORT OF CHAIRMAN OF COMMITTEE ON HORTICULTURAL EDUCATION.

G. B. Lamm.

I do not care what name you give this subject, just so it is taught. There is not one dissenting voice to such teaching. Answering our list of questions some of the best have been sent in by our mothers. Would urge the importance of not making too vast a work of it, but bring it down to simply actual needs. Our children will fairly luxuriate in such work if given the opportunity. One of the most interesting things possible to a parent are children who are taught these things and who can talk intelligently and with sympathy and understanding in these matters. Our Teachers' Association now in session at Sedalia are talking on horticulture and how they can best teach the rudiments. No great high education is needed to teach many simple things along this line. Higher study is necessary for more advanced teaching of course.

Prof. Whitten.—It is well to take up such subjects in order to bring boys into close relation with nature. The country is the best place to be educated in, if one is taught right. Nature study brings the mind into

a spiritual relation to life giving a proper view and greater enjoyment of life. There is a better understanding of the condition of growth with the increased ability to understand and enjoy nature. The subject is new and we hardly know the best plan for introducing it. There is, however, enough knowledge now to make a beginning and then increase this. The courses in the university will show a teacher how to make a child understand plants and animals.

ENTOMOLOGY AND HORTICULTURE.

Mary E. Murtfeldt, Kirkwood, Mo.

It is in the field of horticulture especially that economic or applied entomology has achieved its most signal triumphs. Trees, shrubs and berry plants afford a defined if not very limited area within and upon which to work. Moreover, most of the insect species depredating upon them are comparatively large size, or appear in colonies, or in other ways reveal their exact location so that a remedy or preventive can be effectively applied. Again, the fruit products are so valuable, proportionately, that it has been found worth while to incur the expense of the chemicals, apparatus and labor necessary for warding off or destroying their enemies.

In the case of field crops this has only in rare instances been found practicable. However valuable our grains, it would not pay to spray with Paris green or kerosene emulsion for chinch bug, Hessian fly or grasshoppers. They can only be, to a certain extent, controlled by rotation of crops, by the persistent use of the plow and roller and by other intensive cultivation. In addition to this, birds, many small animals, predaceous or parasitic insects and fungus diseases can be fostered and will render good service, and upon these the farmer must rely for the most part. In horticulture, however, as can readily be understood, direct and specific remedies are perfectly practicable. But even here to obtain the most satisfactory results, with least expense of materials, labor and wear of machinery, some knowledge of the life histories and habits of the more prominent pests is indispensable. This is the main object of

he study and investigation of this branch of the animal kingdom as now pursued at agricultural colleges and experiment stations as well as by many individual entomologists.

Through such observations we learn that it is not worth while to waste effort to capture or poison certain sorts of winged forms, when the species can be so much more easily destroyed by wholesale in the egg or larva state. This applies to the parent forms of most caterpillars, slugs, leaf-feeding beetles, etc. On the other hand in the case of borers and some others, it is against the winged or perfect forms that our efforts at extermination must be mainly directed. The three entirely distinct forms under which many of the most destructive insects exist, make a considerable knowledge of their transformations also a requisite to victorious warfare against them. Their structure, too, must be recognized to enable the fruit grower to apply the proper remedy. It is almost useless to spray with arsenical poisons for such insects as obtain their nourishment by suction, by means of a beak, while for many of the biting species, kerosene emulsion as well as not a few other patented insecticides appear to be merely an additional flavoring to the leaves and buds upon which they feast. Some insects can best be fought at one season and some at another. Sometimes they are to be met in open battle, when in the act of spoliation, and in other cases effort is wasted in this way, when the pests can be so much more easily overcome by what may be compared to an ambushade.

For these reasons it is important that the up-to-date horticulturist should make himself familiar, not only with the caterpillars, worms and grubs that he finds feeding in the orchard and garden, but also with the butterflies, moths, beetles and flies into which they transform, and also with some of the most important of the cannibal and parasitic insects that are always his best friends, and, in the case of some injurious forms, his main reliance for the preservation of his crops from destruction. These include the large, handsome ground beetles, the tiger beetles, the mantis, or "devil's horse," the lace wing flies and a few other cannibal beetles and bugs. Almost every one knows the value of the pretty little lady-bug beetles, as exterminators of plant lice, scale insects and other small pests, but some orchardists seem still to be unfamiliar with their appearance and usefulness. Not long ago I received from one of

my correspondents a half ounce bottle literally packed with specimens of the handsome little, rose-red, black dotted species of lady-bugs that are so common everywhere, "which," as the accompanying letter informed me, "together with their young ones were destroying the leaves and young growth of some of his fruit trees." The supposed "young ones" being a very destructive species of plant louse upon which the beetles had congregated for the purpose of feeding and breeding upon them. The idea that an otherwise intelligent horticulturist should have thus ruthlessly slaughtered so many of his best friends was little short of sickening.

But, do all these points seem to require more close observation and study than the practical fruit grower has time for? Let him not be discouraged. He can acquire a sufficient knowledge of the most important orchard and garden pests to combat them intelligently and protect the insects that prey upon them without laborious study, by keeping his eyes upon and reading his agricultural and horticultural papers. Among the half million or so of described insects he requires to know but comparatively few species, but these he needs to know well, as well as how and when and what to apply in the way of remedies and preventive measures. Some few general directions can be given for the treatment of injurious insects in orchards and gardens that are the result of intelligent experiment and have been proved by years of trial to be entirely dependable. Among these rules are: That all scale insects (bark lice), especially the dreaded San Jose species, are most safely and economically treated during the winter months, while the trees are leafless and in a state of comparative rest. The most effective applications are whale-oil or fish-oil soap, one and a half or two pounds of soap to a gallon of water, or kerosene emulsion reduced by only five or six times its bulk of water. These must be applied to every branch and twig as well as to the trunk, and will penetrate the scales and destroy the eggs that are wintering under them. A much reduced kerosene emulsion applied in June will destroy the young of the oyster-shell bark louse and some other species that are active at that time.

Spraying with Paris green in water—one pound of the green to 200 gallons of water—will in great measure save the apples from the codling moth, or apple worm. At least two sprayings should be given in spring

and early summer before the fruit turns down. These treatments will also protect the tree from the canker worm and other leaf eating pests.

For the plum or peach curculio no application that has yet been tried has given much satisfaction. Clean culture, the careful gathering and destroying of the fallen fruit, trapping very early in the spring by means of cobs, pieces of bark, chips and the like, placed around the base of the tree and the jarring process are, as yet, the only reliable means of keeping this great enemy of the stone fruits in check.

All false caterpillars or slug worms which gnaw off the green tissue or perforate the leaves of roses, currant bushes and strawberry plants are quickly killed by a tea made by steeping an ounce of white hellebore in three gallons of water and applying in a fine spray. This is most effective when put on late in the afternoon or in the evening.

The leaf folder and large caterpillars that attack grape vines can be removed by hand picking with comparatively little labor. The tiny leaf-hoppers or "thrips," as they are often incorrectly called, which are so injurious to the foliage, can be killed by spraying with rather weak kerosene emulsion or with pyrethrum powder in water at the rate of one ounce of the former to three gallons of the latter. These insects are greatly attracted to lights at night and myriads may be destroyed by kindling bonfires or torches at various locations in the vineyard.

For most other insect pests some especial treatment is required of which the limits of this paper will not admit of description, but which may be obtained from all professional entomologists and from many works now on the market on the subject of the insects injurious to fruits and garden products.

A very complete and inexpensive little handbook on "Insecticides and Spraying" has recently been brought to my notice, which I would recommend to all fruit growers. The price is only twenty cents and it may be had from the author, Prof. H. E. Weed, Mont Vista Fruit Farm, Griffin, Ga.

HORTICULTURAL EDUCATION.

By Mrs. Geo. E. Dugan, Sedalia, Mo.

"Princes and lords may flourish or may fade :
A breath can make them, as a breath has made ;
But a bold yeomanry, their country's pride.
When once destroyed, can never be supplied."

Ours is a chimerical age as regards education. A knowledge of living things and of life-sustaining principles are looked upon as useless. An attempt to gain really practical information subjects the student to ridicule. Is it not better to know how to make fruit trees thrive and yield a bountiful supply of health-giving food, than it is to recite Cicero in the original or conjugate Greek verbs while starving to death ?

The noble arts of agriculture and horticulture, the only steadfast foundation of national prosperity, are sneered at by the little people who throng the colleges; those who know a great deal concerning certain text books, and next to nothing about how to earn a living.

"Horticulture in the schools!" shrieks the pedagogue. "I shall oppose it, it is nonsense to introduce a study of this nature; to do so will disarrange our entire program. It will also consume valuable time which ought to be given to psychical research, or to the study of the ancient languages."

"Agriculture and horticulture can be learned by instinct, men naturally know how to farm! Why should a boy be required to waste his time on these things?"

Thus they argue, and thus more and more are the youths of our land turned away, and taught to despise the fundamental principles of all education.

The earth is a wide and deep laboratory of complex agents, which must be studied and mastered before either soil cultivation or horticulture work can fully succeed. The good farmer in this age should be a well taught man in the arts of agriculture and horticulture. Principles may be learned by reading and study, therefore if we are to continue the race of agriculturists, we must no longer seek to degrade, but rather to dignify the occupation of soil culture.

The farmer's son may seem to be akin to the clod he cultivates, to the superficial-eyed, the city youth, but that boy from the fields is studying life. He feels its sharp contrast, he notes that his occupation is despised, and himself looked down upon, and he says with a firm determination of keeping his word, "I will not be a farmer!" As soon as he is of legal age he abandons the old farm, under its haphazard management, and goes into the city, and drives a dray, or measures calico, according as his appearance is good or his ability favorable. Were the principles of agriculture and horticulture taught in the common schools, all this would be changed. Respect for the avocation would bring forth high-minded, gentle, manly farmers, not here and there one, as now, but the masses would be of the above type.

Then, too, the ranks of the agriculturists would not be thinning until the great problem of the rural district is, "How can we keep our boys on the farm?" The farms would soon begin to be crowded, and the new cry would be, "How can we keep the city clerks behind the counter?"

When education shall accomplish this purpose and the husbandman is a recognized king among men, because of his scientific agricultural and horticultural education, then shall we see in rural life the social problem solved.

Instead of the present feeling of degradation, there will be a dignified pride in the only avocation given to man by his Creator.

When years shall have completed an honorable agricultural career, we shall say with the poet:

"A sparkling eye beneath a wrinkled front
The veteran shows, and gracing a gray beard
With youthful smiles, descends toward the grave,
Sprightly, and old almost without decay."

L. A. Goodman.—How is this to be done now? We can not lay down fixed rules to settle it. How to grow fruit, distinguish varieties and trees, to cultivate and make money at it, can not be put into books. Books are not the proper form nor means of knowledge. The way is to take the pupils out to the garden, show them how to plant, sow seeds, graft and cultivate; moreover, for this the teacher must be properly informed about growing plants and varieties. Memory is not the way. In connection with teaching we must formulate some plan for directing the

instructor. If we go to the fields, to nature herself, we get enthusiastic and interested at once, not cramming from books but developing the brain naturally. It is better to know how, by experience, to use the brain than to have it jam full of facts. Little leaflets from Prof. L. H. Bailey of Cornell on seed-growing and twigs awaken the curiosity as to a year's growth and the size and shape of leaf buds as distinguished from fruit buds. Experimental lessons are best, books will fail of our purpose to interest the young in nature and destroy the refreshing effects.

"It is not the question to say it should be done, but how shall it be done. No book or series of questions can be laid down as altogether best. Questions come up every way and can not go down in books. My mother took me out and taught me practical work and made me a horticulturist and this is the way we want to teach it. Much depends on the teachers and they must know how. We want to teach the child to know about growing plants. How to think properly. If we can form any directing plan, with the Teachers' Association committee work, it is the way we can best get at it. One time we thought it a good plan to give a list of fruits to plant, but now we think best to let each think for himself. Books won't do. Take children to the fields and teach them there. I deplore cramming a great lot of book knowledge on this subject, when the scholar is interested at once by actual work. Direct the minds into the right way. Rather teach them how to use head and brain than simply cram the head with book learning. I would not have a book at all, but have some directing line of some kind, so teachers may know how to go ahead. Take a boy to an apple tree and show him how much grew last year and he is interested at once. Same with seeds, he wants to know how at once. A few years ago I thought we needed a book, but now fear that we can not do the best work that way, and we might thus set the young pupils against these things, instead of interesting them in nature study.

Dr. Hensley.—The trouble is teachers have little knowledge to go about teaching. It would be good to have a summer school at colleges and so give opportunity to teach intelligently without a book, what they have learned. They can not get it from books, they need practical methods.

J. C. Evans.—Will this plan reach the masses of farmers?

G. B. Lamm.—It could be taught in the teachers' institutes.

J. Hensley.—Make it practically compulsory, it should be used in every school. The teachers should be informed for immediate surroundings.

Prof. Whitten.—This year we have in our university course for teachers many of our best workers from among the country schools. If a few teachers become interested then a nature course can be made part of the institute work. No revolution is sudden in educational lines, but always gradual.

L. Chubbuck.—Many years ago the present state superintendent of schools threw off as impracticable any plan for introducing nature study, it would have no success in schools, he said. At the next trial he said there was no time; and at the next he took an interest, until now he promises to help spread the movement. I join in commending Prof. Stevens' report, and indorse unreservedly what he says. All we need to do is to unite under Prof. Stevens.

J. Hensley made a motion that the committee on Horticultural Education with the one from the Teachers' Association be instructed to go on and prepare a plan and recommend such to the society at its next meeting. The motion was carried.

Upon call of the chairman of the committee on Horticultural Education, G. B. Lamm of Sedalia, a meeting was held in the parlors of the hotel, the matter of publishing a book was thoroughly discussed in all its bearings, and it was finally agreed upon by the committee that such a work should have the best of experts in every department. This being a time of specialists, a specialist should prepare each different department to make it authoritative and of any practical value. Such a work would be more than any one man should undertake, and it should contain so much information in all lines of work, practical growing and cultivation, insects, fungus diseases, botany, chemistry, geology, etc., that it seemed to the committee unadvisable to attempt the preparation of such a work at this time.

L. A. GOODMAN, Sec'y.

State Horticultural Society.

SIXTH SESSION—Thursday Afternoon.

BEST PLAN IN DISTRIBUTIONS OF SMALL FRUITS.

By G. T. Tippin, Nichols, Mo.

Mr. President:

In attempting to prepare a paper to be presented to the society to-day upon the topic assigned me, I assure you that I have realized in part, the importance of the subject in hand, and fully realized my incapability to present it as fully as it should be. One year ago we presented a paper at the West Plains meeting somewhat along the same line. At that time, with one season's experience in co-operation for the distribution of fruits, we felt very much encouraged, and that we knew considerable about it. Since that time we have passed through another season, been in close touch with all the berry districts of south Missouri and Arkansas, witnessed the operation of three different systems of distribution conducted by the organized associations, in the different districts. We now feel that we know but little about it, and that but few have yet fully realized the importance of this matter. More important than the knowing how to plant, to grow, to harvest and pack, is knowing the best method of distribution, and carrying it into successful operation. Failing in this destroys the possibility of any profit upon all labor and expense necessary to put our products into the finished package. Feeling that as yet we would not be able to suggest a perfect plan of distribution, we hope that by a review of the work along these lines, calling your attention to the good points as well as the weak ones, the different agencies that enter into the distribution of our large and small fruit crops that have a tendency to destroy the very object of our efforts, suggesting what we think would be best, and the discussions that may follow, we will be able to make a great advancement in this direction before another year. One of two things are inevitable. A more systematic and business way of disposing of our perishable products or quit the business. No business will long continue that does not yield some profit to those who are chiefly engaged in its pursuits. Taking this view of the question the producer at once becomes the most interested

party, and we shall endeavor to present our ideas of the best plans for distributing small fruits from his standpoint alone. In doing so, we feel quite sure of bringing upon ourselves the criticism of some whose interests in the distribution and sale of our products are only entitled to a secondary consideration. Accepting the fact, however, that unless the business of production is so managed in all its phases as to insure a profit to the producer, we believe that the criticisms from these sources will not be given more consideration than they are entitled to by the grower, and we will be justified in undergoing the same, if by it some good may come out of it. In the Van Buren district an effort was made to organize all the associations into a distributive union, managed by a central committee composed of one member of each association belonging to the union. Their plan of distribution being as follows: The number of the best markets were selected each day according to the number of cars to be shipped. The number of the cars placed on slips of paper, put in one box, the names of the cities on slips in another box. A slip was drawn from car number box, a slip from box containing cities to be used that day, the car number and the name of the city thus drawn, fixed the destination of that car. Had all the associations gone into it and the plan been honestly carried out no doubt but that it would have accomplished great good. But for lack of confidence in its objects and management they were not able to control only a little over one-half the car load output, besides the express shipments, consequently accomplished nothing. A co-operation in any district that does not control almost the entire output can do but little good. North of the mountains to the Missouri line the associations undertook a different plan. Each association to have choice of market by turn. The first to-day would have last choice to-morrow, which was not satisfactory, as it so happened that some of the associations had an advantage in choice of markets for several days over others, when prices were better at beginning of shipping season; and several other points, shipping outside of this arrangement, at the same time and to the same markets selected by these associates. In Missouri but little attention was paid to distribution this season, owing to the fact that some of the associations withdrew, some of the larger ones did not belong, and principally owing to short crop, and little danger of glutting any markets. However, if we had had as large a yield ac-

according to acreage as in 1897, we would have been in bad shape. No doubt you would ask by this time why these co-operative movements do not succeed. I will answer as best I can. First, for want of confidence of the grower in the management of his local association, and his ever readiness to listen to the advice of a representative of some interest that will receive a hundred cents on the dollar whether the berries are properly distributed and sold or not. Second, the want of confidence of one association in another, putting themselves in a position to become the victims of advice, schemes and plans suggested by those whose only interest is hidden in a selfish motive. It is too bad that this condition exists, and while there are a few instances where the confidence of the shipper in the management of his association and of one association in another has been abused, yet in almost every instance the cause of the wrong done had its origin with the representative of an outside interest. This condition will continue until we incorporate better business principles into the handling of our products, and we are frank to say that we will not accomplish anything in distribution until such time as we will be able to form a closer and better business relation with those who handle our products. By doing this we will be able to eliminate to a large degree the unscrupulous representative of any interest, whose only care is that he, or those he represents, may get their share of the proceeds of our product, apparently unconscious of the fact that if we make nothing out of our business we will be forced to quit and in that event they will get nothing at all. So long as the consignment of our perishable fruits are governed in part by the same influences that they have been in the past all efforts and plans of distribution will fail. You ask, what is the solution? I would answer, that the most gratifying of all to the weary husbandman is selling on the track. This would solve the question of distribution. But not being able to do this as yet, we suggest that which we think the next best thing. Before doing so, however, we will suggest some changes that will have to be made along our line of work before we can hope for much profit in growing small fruits in a commercial way. Instead of packing our fruit in a slipshod way we should pack it under a brand, should not make more than two grades, and both those good. Each association should seek to build up a trade on its own brand of goods. Take our first step in distribution

by abandoning old berry fields, and the idea of farming berries in large acreage like corn; distribute our small berries at home to the canning factory, or on the dump pile; reorganize our associations under more rigid rules, barring anyone who would not pack stock that you could guarantee under your brand. Having done this, we are in a position to form such contracts for the handling of our small fruits as will help us in distribution and selling at home as well.

The theory of either plan of distribution referred to is good, but the plan of the southwest co-operative union we think the best, as it leaves the business of each association in its own hands. Yet in case of a large shipment it would fail in part unless the central office should have the power to divert cars when too many were enroute for one market. To exercise this power would open the way for dissatisfaction in all instances where such diverted car should happen to not do as well as the association shipping it expected. The representative of the market from which car is diverted is too often ready to take advantage of such dissatisfaction, seeks to encourage it, hoping thereby to be able to secure more business for himself. Recognizing all the distributing elements ever present, how easy it is for the shipper to be deceived into making consignments on misrepresentation of markets and conditions.

We believe the best plan for handling our crop would be for each shipper or association to make its own arrangement. They should make careful estimate of their probable output as early in the season as possible, select the number of markets to be used according to the daily supply you will have. If you will have but one car daily, select one market. If five cars daily, select five markets. Make a business contract with some commission firm whom you know to be reliable. Enter into a mutual agreement with such firm to furnish him his needed supply daily regularly, they agreeing to handle your product exclusively as long as you can supply them. By doing this, and packing your products under a brand, the selling agent can build up a trade for you that is permanent, and one that he can afford, too; he will take care of it by treating the shipper right. This will do away with the irregularity of supply under the present system which is so often disastrous. In marketing perishable products one car daily in a market may be all right, while to put the three in one day, and none for the other two would

be a heavy loss. Having observed these conditions closely for three years at both ends of the line, in the absence of our not yet being able to sell all our products on track, we believe this the best course to pursue. And would state here that Mr. Hale, of Connecticut, one of the largest peach growers in the world, packs his peaches under a brand, handles them on this plan, bills out his ten to fifteen cars daily in a few minutes, sits down, has a pleasant chat with the boys for an hour or so, goes home early, retires to his quiet rest, makes money, while his neighbors who handle their business like we berry growers, are hounded from office to packing shed, from shed to shipping station by an army of people who have the best markets in the world. With over taxed brain, tired body, confused to the utmost, fifteen minutes before the train is to leave that hauls his stuff he makes his consignments and, like the panting hare in the heated chase in seeking its only refuge, goes into a hole oftentimes never to recover from it, "financially." What applies to distribution in car lots will apply to express shipments. This brings us to the consideration of another factor which enters very materially into successful distribution outside of refrigerator car shipments, and that is the express business. We used to on the farm, when I was a boy, have a mule that was the meanest mule I ever saw. He would break over any fence, invade any premises, it mattered not how private, and was never satisfied with his share of the feed, but to keep him steady at work and feed him by himself he was the best and most useful mule on the farm. It is about the same with the express companies. The only way to keep them from knocking down the fences around our arrangements is to hitch them up systematically and work them, which I think we can do successfully if we can only find an antidote for his appetite. But that appetite, oh, my! It is awful. Yet they say that they do not consume much more than other carriers we are using. This is true. Yet it is poor apology when the others are charging exorbitant rates. One way we can get even with them if they won't divide, and that is to quit the business and they won't get any thing out of the small fruit business. Pardon this digression. The express companies can be used to great advantage in distribution by using them in a systematic way. Hundreds of small cities and towns can be supplied with berries direct, that as yet have not had any berries to speak of during our shipping season. The

associations should make their arrangements with the route agents in time, so that with their assistance in distributing, different lines of road or sections of the country could be supplied from the different shipping points, always bearing in mind to arrange your loading so as to avoid transfers if possible. The idea being to get your berries to the market as direct as possible. By reaching all the points that can be reached by local express in this way that will take all the way from one crate to three hundred per day, we can distribute lots of our small fruits to good advantage, which will largely prevent glutting the larger markets.

In conclusion allow me to suggest that the growers, the transportation companies, and the selling agents, or commission firms, who sell our products get closer together, adopt more practical business methods, and where we have been able to sell many packages and a number of cars this season on track, we will be able to sell many more next year.

Respectfully,

GEO. T. TIPPIN.

DISCUSSION ON DISTRIBUTION.

J. Hensley.—The conclusion is that if the inferior fruit were disposed of at home and the rest sold on the track, distribution would be provided for; but when there is a car load on the track and no one to buy, what then? It is said the express, railroad and commission companies are all robbers, but I do not feel so. When eight and ten shipments of berries are consigned at once and they have to be sold at a loss, the commission men are not to blame. The way is to consume and can at home, sell on the track and ship to large markets to be sold at auction. Have an agent at the market to say when to throw the car onto the market and sell to the highest bidder. Find out what towns can use the fruits and arrange with the express companies to take them there and send as many as will be consumed. Not one in ten has a good meal of strawberries, even this year.

D. McNallie, Sarcoxie.—My experience has been that we are in the hands of the railroad and commission men and must submit. There is room for advancement, but that has not been devised. We could dispense

with the luxury of the solicitors. They make trouble and low prices, want stuff regardless of what the market can use. Every association ought to notify its commission house that it will not consign if they keep a solicitor out.

Mr. Fowler, Waterloo, Iowa.—Growers should know what they are to receive when they sell. One trouble is that the shippers send other cars when the commission man could give a good price for one. Our house goes where the fruit is grown and buys and pays for it. This is the way solicitors should do, for by owning the cars they take more interest in them. The growers need the solicitor to sell to, not consign.

Evans.—The time has come for proper distribution. Much fruit is lost which had better be dumped than sent to market and express paid for it extra. Say to your solicitor, "pay for the car and the wheels will turn, but not before." The commission man can beat us at distribution. There are not too many strawberries, but too many sent to one market because the solicitor wanted to scoop the other fellow.

A paper was read on "Relation of Transportation to the Growers of Small Fruits," by Maj. A. McKinney, of Pierce City, Mo.

DISCUSSION ON TRANSPORTATION.

Irvine.—Can part of the car be sold en route?

McKinney.—Some transportation companies permit this selling along the line but it is not general at all.

Helvern.—We billed a crate to Minnesota but could sell it anywhere we wanted to.

McKinney.—Will the company switch the car?

Helvern.—We started a car and had time to unload fifty or sixty crates at stations on the way.

Evans.—You have to put your large crops of fruit in refrigerating cars and can not expect to stop and take it out. If you ship a small amount, the law allows you to unload any part anywhere and this is practicable with small crops.

Helvern.—First class berries never overstock the markets, but too many poor ones are shipped and we do not realize anything on one-half of our crops because they are poor. I never put in a poor berry and never lose on my sales, but net fifty-two cents clear of everything. Take care of inferior fruit by canning and so save money.

H. Adkins, Searcoie.—Our association sells on the track and all other points agree not to consign but to sell on track.

Tippin.—Auction is impracticable, as strawberries are too perishable. Selling on the track will do with smaller crops. We should practice more system ourselves and thus do away with solicitors. Many will not buy when others consign to the same point. The part you can not sell should be cared for at home.

Atwood.—There ought to be a meeting of the north Arkansas and south Missouri growers to talk these matters over.

Adkins.—Berry growers need to meet and formulate plans to keep up with the commission, railroad and refrigerating men.

WINTER INJURY TO FRUITS.

By G. W. Hopkins, Springfield, Mo.

If we had had an ordinary season last fall and the trees had grown late in the fall then we would not have had any live trees. The winter began October 17th and we can not yet tell how extensive the injury is. A hot, dry season will kill many trees. Every peach tree has its wood discolored to the snow-line but all right below. Some have cut their trees to the snow-line, some have cut the tops back severely, others not at all. The medium plan has been the golden one. The young trees cut back just ordinarily made a good growth. The six-year-olds I cut off five to six feet and the limbs have grown finely. Some trees were hurt also by the drouth and may never recover. Some six-year-olds not cut back at all have put out their leaves but they look as though they would die. I would not cut so severely again as I did this time,

and thus get the leaves out earlier. The bark bursted on some trees, yet the cambium layer appears sound, although the wood is discolored.

Keiffer pears were injured in the February freeze, some even so the wood was black, but I left them alone; they grew finely and there is no trace of the discoloration now, but have fine specimen trees in prospect. Some thought that on the frozen trees blight would appear more, but not so. Keiffer looks fine.

Cherries bloomed well but the fruit is dropping and trees look as though they were dying all around.

Japan plums are hurt but Wild Goose and others not so much.

The injury to apples was started in the drouth of 1897. Older trees made a fine growth, and foliage is as green as at any time. The younger ones show the injury in a sickly, yellow appearance. Where the roots and trees were not cared for, there the trees are invariably hurt the worst.

The wood of the Kansas and Progress raspberries is uninjured to the tips. The vines were well mulched with crab grass which grew up and stayed all winter. The canes were fine when I went in to trim them. The Hopkins is reported good and where covered show little injury.

The Snyder and Taylor blackberries will have a good crop and were apparently unhurt. The Early Harvest promises a good crop though it has a tender bud.

Red raspberries were killed to the ground but there are some good returns now reported.

Goodman.—If seven and eight-year-old apple and three or four-year-old peach trees are now uncut would you prune them?

Hopkins.—Never at this time, the leaves are needed and loss of them would kill the trees.

Evans.—Why are the old ones hurt more?

Hopkins.—I do not know. The young ones are not so; the two-year-olds are the same way. Old trees were on the decline and had had less care.

Evans.—The old bark is stiff and does not contract and expand readily, so is erupted from the wood without bursting and the air gets in so that it never adheres again and dies. Young bark is pliable and does not split.

Hopkins.—On six-year peach trees the bark split and curled, yet the leaves put out well.

Hensley.—Would you cut the injured part now?

Hopkins.—Yes; but not dehorn.

Goodman.—Where the tips are dead will it not be good to cut off four or six feet down to the sound wood?

Hopkins.—If you do not cut off too much leaf surface and enough is left to avoid harm.

Helvern.—Mt. Rose, Crawford Early and Elberta limbs broke with fruit one year and I sawed off these and even others about July first but they made a pretty growth and were not hurt by frost.

Evans.—No; the cold will not hurt those cut off, but the trees now dying at the tips will be dead in August.

Hopkins.—Elberta, the tenderest in bud, but hardiest in wood, of all, started finely.

Murray.—In Holt county, there seems to be a peculiar condition. The apples are killed at the root and peaches are not hurt. This is true in the nursery as well. Thousands put out well but are now dying. Young pears are three-fifths killed. Peaches are killed in the top, but not badly injured in the body. I advise cutting off half way down so the body will support the new top, and next year we will get fruit. In north Missouri the ground froze first under the snow, then froze four feet deep and lasted from February until April. In consequence we will have good prices for some years; better varieties will be produced and overproduction is buried.

Geo. Bill, Arkansas.—In Wisconsin one winter the ground froze to a depth of seven feet, and the sunshine, dry wind and warmth created sap action, but the roots did not act, so the trees were lost. Native cherries were killed in the same way this year in Arkansas and the nurseries also.

Irvine.—Forty per cent of the Ben Davis trees were wrapped with wooden veneer wrappers and the bark on those trees is turning black almost clear around, the unwrapped trees are not so. Of 3,500 trees in wooden wrappers many were lost by excluding the sun and air; they also wore by rubbing the bark and proved a harbor for all kinds of

enemies. We are now using wire wrappers and the loss by borers is ten per cent less.

Goodman.—I have used during the last five years over 150,000 tree wrappers, wooden veneer, one-twelfth inch thick, ten inches wide, eighteen or twenty inches long. The wooden wrappers I always put on the trees as soon as planted. I have found them the cheapest and best protection, taking all things into consideration. The pores of the wood give enough air to cause a healthy growth of the bark and do not retard the growth in caliper of the trees. The shade that these wooden wrappers give the bodies of the trees, gives enough better growth to pay for putting them on. Besides this they protect from the rabbits the single trees and almost an entire protection from borers. As for the injury by mice, I have lost so few of them that it is hardly worth mentioning, but one thing I am always careful to do and that is to clear all weeds and trash away from the trees for at least two feet. The other trouble mentioned, the bark of the trees turning black, I have not had occur on one tree in one thousand. I consider them so valuable that I always use them but I keep the trees clean of weeds and trash. They do not exclude the air or sunshine enough to even make the bark tender, but they do keep the bark bright and healthy.

THE IMPORTANCE OF UNIFORM APPLE PACKAGES.

By John T. Snodgrass, West Plains.

I hope this brief paper will lead to a general discussion, for it is certainly a subject of sufficient importance to all interested in the growing and handling of the peer of all fruits—the apple. Friends, you will excuse me if I depart a little from my subject and state that the apple should be picked when ripe, not green, or allowed to hang until over ripe. Pick and sort carefully and pack only the perfect fruit. Some who have large commercial orchards may pack at once in the orchard but I prefer putting them in slatted crates holding a bushel each, or in open barrels: haul to warehouse and there store or pack as we wish. Now as to packages I would say three kinds. Why not pack to please the consumer, for

the nearer we get to the consumer better prices we get. I would specially recommend the shallow two-layer box for summer, fall and fancy winter apples; then the bushel box for our next grade summer apples. Would not use barrels for summer or fall packing. Our winter apples carry better and keep longer. These I would pack largely in bushel boxes. These boxes are eleven inches wide, eleven inches deep and nineteen and one-half inches long. They can be had of any box manufacturer. Anderson Tully Co., Memphis, Tenn., quotes them seven cents each in car lots, knocked down. Three of these boxes costing a little less than our regular three bushel apple barrels.

As before stated, I would pack our fancy varieties in the shallow two-layer box, wrap each apple. The balance in bushel boxes and standard three bushel barrels. Put nothing but first-class fruit on the market; build evaporators and use inferior stock at home. Why pay freight, commissions, etc., when you can get more out of it as evaporated fruit.

If we use the barrel, see that it is the standard three bushel, six hoop, made well. I get the regular stock in knock down and have my own coopers make them. Nail your hoops on well and use head-liners, for the commission man has good reason to complain when he comes to open a barrel of apples where they have used from twelve to thirty nails to fasten in heads. Had they used liners three or four nails in hoops is enough and three nails in each liner, which can be taken off very easily.

Face your barrels carefully with two layers of average apples. Be careful and not put all small apples on face end, then sort carefully from sorting table. I use table made from two by four scantling covered with heavy duck, allowing an apron of some four feet over ends. Pour your apples from your crates out upon this table; the packer having faced his barrel, places it at either end of table and brings the apron up over the barrel. As the apples are sorted into this apron it is let down into the barrel preventing them from bruising, gently shake the barrel at least twice while filling, round it up well above the chime of barrel, put on your lever press and force the head into place, fasten it, and your barrel of apples is ready for market ruined before it leaves your door, for you all know it is impossible to pack a barrel of apples tight enough to carry fifty miles without bruising more or less every apple in the

barrel. That is why I dislike the barrel and recommend the bushel box. You can gently press the lid of the box into place without bruising the apples and they can be packed in car to good advantage and the consumer will buy a bushel box of apples instead of a peck or half bushel when he knows the fruit is not bruised. They can be handled just as quickly as barrels and I hope the day is not far off when we will adopt the bushel box as the apple package.

I thought it might be well to get an expression from the commission merchants, retail dealers and consumers, so I wrote many of my personal friends north, east, and south, asking what style package they preferred and will read you the replies as far as received. Two of the leading firms of Minneapolis differ as to the package, one advocates the standard three bushel barrel, the other firm without doubt handles more of the far west fruit (California and Oregon) than any house in the northwest; they say let it be the bushel box, a neater package to handle and less opportunity for fraud in packing. The large fancy grocery house of Cincinnati, "The Joseph R. Peeble's Sons Co." say they prefer the bushel box. John Wannamaker, of Philadelphia, says the bushel box, and the letter which I read from a consumer certainly merits our consideration for it is the consumer we should try to please. Put up all our fruit in as neat and tempting packages as possible.

DISCUSSION ON UNIFORM PACKAGES.

Nelson.—Anything that brings three to eight cents extra to the producer is worth working for, and the ten or thirty cents on a barrel besides. Good barrels are scarce now. We must have boxes for successful package for our best apples.

G. T. Tippin presented the resolution which follows and it was adopted:

In view of the increasing demand for apples packed in bushel boxes, both for domestic and export trade; of the greater convenience of this package for retail use; of the less liability of damaging fruit when packing and handling; of the better shape of the package for cold storage than

the barrel; the use of the box for packing apples is therefore recommended by the Missouri State Horticultural Society.

Evans.—This is a good step in a great reform. I favor a box for all apples fit to go to market, and sending the rest somewhere else.

Tippin.—Such a reform will be adopted rapidly as the consumer reasons that little apples will not be put in the middle of a box as they are in the bulge of a barrel.

SHEEP RAISING AND ORCHARDING.

By I. B. Lawton, Bentonville, Ark.

In recommending a sheep flock to the horticulturist there is a strained relationship that calls for the sheep to rise and explain. Sheep do excellent work in an old, well established orchard. They gather up wormy fruit as well as hogs, clean up weeds better, and know just how high the branches should be from the ground. They are neat and orderly in their ways, distribute manure just right and leave a neat, well-kept fence row. Of course, if it is a young or cultivated orchard, sheep are not "in it," but that also applies to other stock. They have a bad tendency, or some individual animals have, to peel the bark of young trees. Really, the sheep is not much of a horticulturist, but is an all round good fellow to have around.

It is a well-established fact that there are off years in the fruit business—years when untimely frosts sear our hopes, when insects and fungi come like a thief at night—years when over-production or under-consumption saps the finances out of the business. Then sheep culture comes in. Each one brings about a dollar's worth of wool in May. Early lambs and fat wethers sell at four or five dollars each in June or later. If the fleece pays for a year's food and care, which in most cases it will do, the sale of the sheep is profit, and a right good profit, too.

Not many orchardists plant all their land to orchards, and the average farmer does not find it profitable to plant more than one-fourth

of his farm to fruit. Some lands and some localities are adapted to the profitable growth of grain, but more is adapted to the grazing of sheep and cattle. I do not speak of grain farms and stock ranches, nor of the orchards that cover hundreds of acres. The owners of these are specialists, and I hope make both ends meet and lap a little; but some years there is need of a connecting link, even with them. I speak more especially to the farmer who has 160 acres or less, and makes fruit a leading business. It goes without saying that he keeps a team and two or three cows, and considerable pasture land. At long intervals, even the apple orchard grows weary, and it is better to plow and prepare other fields for fruit, and pasture what was the old orchard.

We are not all prepared to follow intensive farming, and I know of no better way to rest a long cultivated field than to seed it to a variety of grasses, and when well established let the sheep have it.

I do not mean to lose sight of horticulture. Our Ozark hills and plains are especially adapted to fruit, but as I stated before, there are years when the horticulturist gets but little income from his orchard. A small flock of sheep does not require much outlay of work or buildings. The care required is mostly in the season when the orchards need the least work and pasture they take is partly weeds and bushes that should be fed off anyway.

I intimated that a good sheep would pay for his keeping with wool and the increase and sales were profit. This is true to a certain extent but because money is made by keeping twenty or thirty sheep, it does not follow that the flock can be doubled or quadrupled with the same profit per head. It is better to keep below the happy medium than to rise too far above it.

While sheep are not great feeders, they suffer from a starvation diet as badly as anybody. They need a dry shelter for winter and during severe storms, but they do not need very tight stables. Any one who takes an interest in sheep and uses good common sense can learn to care for sheep well. Like other stock, if they are comfortable they thrive well, and if they are uncomfortable from cold, hunger, or other mistreatment, they do not thrive well. With proper care, in a hilly or well drained country, sheep are almost exempt from disease.

Dogs are the greatest dread of the sheep owner. A man that has a good farm, large orchard and other sources of income does not keep many dogs, but if he has only a large family of children who must get their fruit from the neighbors' orchard, he keeps several dogs who prowl around at night and sooner or later learn to kill sheep. My greatest success with fruit trees has come from a custom of burying half of a dog on one side of a fruit tree and the other half on the other side. Thus directly and indirectly, I find sheep are a great benefit to a horticulturist.

Beyond this fact it is not necessary to go. The different breeds of sheep, and the details of their management, are not what I wish to impress, but that sheep bring in a steady income that is always convenient and, if fruit fails us, is a necessity.

SEVENTH SESSION.—Thursday Evening.

Music by Kreyer Orchestra.

HEALTHFUL HOMES.

By Mrs. J. R. Milner, Springfield, Mo.

THE FIVE FOOD PRINCIPLES—THEIR RELATION TO HEALTHFUL HOMES.

Atkinson in his *Science of Nutrition* says, "I find the most hopeless poverty among American people to be the poverty of ideas. They seem to be born with one, and, by living, to acquire just one more—the first to make money, and the last to get rid of it. As a result of it their lives are seldom rich unless their pocket-books are inordinately so. The great charity of the day is to be that of teaching people with small income how to spend it wisely, a charity which depends upon the efforts of individual women, who are studying this subject and applying the fruits of their study in individual homes."

This seems vastly encouraging to those of us who find the beginnings of economics so difficult. The way to results so long, bristling with difficult chemical symbols, or barred with words which are new, and to the casual reader unintelligible.

If we might but let down these bars, rake out some of the thorns, smooth the pathway, making it so very plain that "he who runs might read" should we not aid a good cause?

The health of our bodies and the economy we would like to teach, demand intelligent action; we can not enter this study with hope for improving our own homes, or those about us, without knowledge of chemical laws; we must know how it is food builds up, how active exercise tears down; how food heats the body, how heat is spent, the kinds of food that generate heat, the ones that repair waste, and those that store away fat. We must know the laws which govern supply and demand. We must make the acquaintance of food elements in order to select the most nutritious; we must know their kind, their differing proportions, their comparative cost, since our poor economy in purchasing is largely ignorance and still further because our erroneous habits of eating for, lo! these many years, spring from the same cause, habits which have become so fixed we can never expect to eradicate them until we begin at foundation principles to manage the educating process, so that it will filter through the upper stratum of society, and reach the masses of the very poor. The problem is how to manage that this result may be achieved. It is in furtherance of this filtering process that many golden words have here been strained of their symbols, their terrorizing technicalities, and put in simple form. The facts are none of them new; we are indebted for some, to a compilation made by a member of the Mothers' Club in Kansas City, to Atkinson, Helen Campbell and others. Bishop Foster says, "If we care for men's souls most effectively, we must care for their bodies also." "Half the struggle of life is a struggle for food," says Atkinson, while Sir Henry Thompson seems to "point this moral and tell a tale" when he says "I have come to the conclusion that more than half the disease which embitters the middle and later part of life is due to avoidable errors in diet and that more mischief in the form of actual disease, and of impaired vigor, and of shortened life accrues to civilized men in England and throughout

central Europe, from erroneous habits of eating than from habitual use of alcoholic drink, considerable as I know that evil to be."

Observation and experience can not but impress the fact that something is vitally wrong. Waves of influenza and la grippe sweep at intervals over our country from some supposably malarious vicinage, or because of some unusual exposure; epidemics come yearly it will be found on examination, to the lame and the lazy, the illfed, careless livers, the gourmands, and gluttons, but leaving intact and in touch with the world, the hygienically disposed portion of the community. Observation and experience, therefore of scientists leads them to make every effort to correct these errors that the physical health standard may be raised, that the moral health may be improved since morality must have good physical conditions as a basis. Until very recently, dating back to the revival of domestic science study, little attention even by the intelligent people has been paid to these things, while the lower classes, influenced wholly by the dictates of the palate have been held in check only by the emptiness of their pocket-books, displaying their ignorance by spending their slender income upon incongruous and innutritious materials, feasting upon some extravagant dainty one day, and having a veritable famine of nutritious foods the rest of the week. The result of course, is a pallid, pinched look upon the face of the innocent little ones, a constant succession of colds, fevers and intestinal troubles producing mortality that is appalling. An entirely wrong impression among this class of people prevails; if the word of economy be so much as mentioned, they retort that it is impossible for any one to be more economical than they are—not realizing that it is an economy depending upon a proper balance of food elements necessary for right body building, which is meat, and that no economy can exist if ignorance underlies it, since it must result in waste of material and some form of disease. Dr. Schrodts says, "I have long ceased to doubt that, apart from the effect of wounds, the chances of health or disease are in our own hands. If people only half knew the facts pointing that way, they would be ashamed to be sick or have sick children."

It is to an investigation of these facts we urge all of you mothers. The first principles may seem a little dry, but some dry bones are nec-

essary upon which to build the flesh and blood of the body, and besides if the truth be known they are dry only in appearance—every bone in the human body has its blood and nutrition bearing tissues, so do the dry bones of terms in chemical study contained concealed all the nutrition of the ages. It is for us to go a little below the surface and bring this light. Our knowledge may not be great of proteids and carbohydrates, but we have come to know certain things by the old fashioned names farinaceous and starchy foods, saccharin or sugars, fats, etc., and we are now to apply new names to the old compounds, that we may the better trace their scientific relations and uses.

First then let us see for what purpose the body needs food, that we may understand the better how to supply the demand. There may be some who if asked why we eat would reply "to live," but to go deeper, one may ask "upon what does living depend?" and find that we are at one step beyond our depth—for it seems to depend upon ever varying conditions. Of one thing, however we are sure, it depends upon a uniform necessary degree of heat. Winter or summer the temperature of the human body must be sustained at ninety-eight degrees or we die. It may, and often does, for weeks and months run higher than this, but it must not be lowered. The tissues may decay, the body waste to a skeleton and life be maintained, but there comes a point, when if the heat-producing element be not supplied, the fuel within exhausts itself and life ceases. Fire dies in the stove from the lack of fuel, and the process, called chemically, combustion, must cease. Body combustion is not different from the combustion in our stoves, except that the union of elements takes place in the body individually in cells while oxygen and carbonaceous material in the stove is a concentrated union producing visible light and more or less intense heat.

Here then is our first necessity—heat producing fuel food. When we build fires we open our drafts, giving abundance of oxygen, a process which is equally necessary to the body. The one point which parents, nurses, even doctors are apt to forget—inquiry is made if baby took his food in full measure, but to inquire if baby took the fresh oxygenated air which is necessary for the food's combustion would be what—foolish, unnecessary. Does it go without saying that this oxygen is every where present and of course baby has it? By no means, for the atmosphere

of far too many homes has had the oxygen consumed by red hot stoves, made heavy with the carbolic acid gas of smoky lamps, or of still worse smoky fathers, not to speak of the combination of impure breath coming from the whole family. If we could look at it under a microscope we should see it full of wiggling body exhalations, yet mothers and nurses taboo opened windows—drafts are so dangerous! Put then first, most important of all that feeds the baby—or the grown up body as well—oxygen in full unstinted measure. Never be without a full stream flowing from some source, for the good God has made it free to all creatures. The amount we should take is more by weight than all the other food elements combined. Next to oxygen in importance we place water, for it makes up from two-thirds to three-fourths of our bodies. This large per cent must be supplied from some source. Since many elements used for food are compounded of water we obtain much in this way—besides we have a natural craving which would lead us to seek it, but as a matter of fact modern scientists assert that we do not drink enough, nor for that matter the right stuff, so much of our drink being mixed with mineral and organic impurities. Besides air and water we must put into this wonderful chemical laboratory of the body as heat producers, nitrogenous and carbonaceous foods, for there is work to be done—energy generated. As Mrs. Richards says, “The power to do mechanical work comes from the consumption of fuel, the burning of woods, coal or gas; and this potential energy of fuel is often expressed in units of heat or calories, a calorie being nearly the amount of heat required to raise two quarts of water one degree Fahrenheit. The animal body also requires its fuel, namely food, in order to do other work, its thinking, its talking or even its worrying. The animal body is more than a machine. It requires fuel to enable it not only to work but also to live, even without working.” We can not go directly to nature for this force power, that is, we can not obtain the elements, oxygen, hydrogen, nitrogen, carbon, sulphur, sodium, etc., as such, for these mineral elements in a state of nature are wholly useless as food; even nitrogen which forms about four-fifths of the air we breath, can not come to us through the lungs, as oxygen does, but must be taken from foods which contain it. We can not as the plant does take food at first hand, for air, water and soil fill its needs; we must take the products manufactured by plant life as

do all the animal tribes. But the great Creator has made as admirable provision for our needs as if we could go to the storehouse and obtain them at first hand—only unlike the grass and the lily of the field which toil not neither do they spin—we must expend force and energy—we must toil to give our bodies food. Probably nature's economy is herein right, though mankind have since Eve ate the apple been quarreling with the fate which has so decreed. The cereals have proven to be nature's second hand storehouse, combining more nearly all the elements needed by the body, and in more nearly the right proportions than any other available food product. Of all grain foods wheat is the best, as it seems to contain all the five food principles. The most healthful food will always be that best adapted to the wants of the user and there must be a certain amount of individuality, and in choosing combinations which give proper quantities of the several food principles one must be guided not only by the amount of each principle, but its digestibility when so compounded, also its palatableness. To secure appetizing results it is quite as important as to have nutritious elements, for the best of food would otherwise go begging on our tables. Mrs. Weeks says, "Flavors, savoriness, are all aid to digestion, but this means something very different from our American fashion of black pepper over every thing." The use of sweet herbs is regarded as a foreign fashion, and the American who says: "Give me good plain cooking, has his portion of dyspepsia in large part because of the lack of intelligence of these things; for the plainest, simplest food by their use is made enjoyable." There is a very seeming possibility that excessive use of condiments would bring more injury and dyspepsia than lack of them, however we will not quarrel over this now, being more interested in knowing what rule is to govern us in our choice of proper kind and quantity of food material. German chemists have experimented so carefully—we are told that they have accounted for every partical of food passing through the body of man and have constructed dietaries for use among the lower people, their soldiers being fed so many grains of carbohydrates—so much of protein and so much of fats. Mrs. Rorer says in Household News, "We have in the vegetable kingdom ripe peas, beans, lentils, rich in nitrogen and consequently good muscle making food. One gets double the amount

in such food as beans, as in beef, but it is well to note that the analysis of food is one thing, the amount we are able to digest is quite another." Hence comes in a decidedly new consideration—our food may be quite rightly proportioned and cooked—for some stomachs—yonder red faced, hardy plow boy or the hod-carrier with his tale of bricks, will carry off his full measure of fat beef and potatoes, roast pork and beans, all sorts of fried dishes and rich desserts of pudding and pie, sleeping soundly and going heartily to work the next day while the pale faced student who attempts the same thing would probably break down in a month with nervous indigestion. So the element of quantity as well as quality must be studied and adaptability to individual needs more than either. This, however, need not prevent our settling the grand foundation principles which are the same in all cases. There should be definite amount of nitrogenous food, of carbonaceous food and of fats, and if the vegetarian makes up his dietary from cereals, legumes, fruits and nuts instead of including animal products, proving the while by practical demonstration, as they are doing abundantly, that healthy, hearty bodies can be made of this form of protein and carbohydrate who shall dare affirm any definite *sine qua non*?

The common names for the food principles are by chemical writers changed to protein for nitrogenous or flesh and muscle making foods, hydrocarbons instead of carbonaceous foods, or fats, in other words heat producers. Lastly, the carbohydrates (sugar, starch and gums), which are the foods for energy or work. These are all found in both animal and vegetable kingdom, as if the Creator had made provision for the varying tastes of his children. Atwater, in his writings, gives a most interesting description of how the chemical amounts of food elements in giving dietaries are determined. Nitrogen, the most important element, we can not obtain from the air although it forms four-fifths of its composition, we get it from the proteids, and the albuminoids, and numerous as the protein compounds are the proportion of nitrogen is nearly the same in all, and may, therefore, be taken as a measure of comparison. As Atwater says: "The science of nutrition as it is taught to-day, has this marked peculiarity, it is a matter of definite quantities of income and expenditure based upon a kind of chemical book-keeping the accuracy of its teaching is, in a certain sense proportional to the accuracy to which

the accounts are kept." As a matter of fact, the two sides of our equation, supply and demand, are likely to show many inequalities. How many cooks, how many mistresses who provide any plan that their daily rations shall be made up of food elements properly balanced, selected and put together with relation to their digestibility? How many ever put the price of elements and nutrition side by side and purchase accordingly? In some respects as our writers will say we have not gone so far astray, for the standard dietary is meat of some kind and one or two vegetables. While beef and potatoes, mutton and rice, lamb and green peas, duck and fruit sauce are common, and yet perfectly proper unions. Nor would it be difficult to prove how our brawny New England forefathers came by their tough, sinewy bodies. Codfish (richest of all articles in protein) potatoes (pure carbohydrate) pork and beans, rich in fat, are notably muscle making foods. An equally good philosophy exists in the Irishman's use of skimmed milk with his potatoes, or the Schotchman's fondness for oat-meal, haddock and herring. Yet if we heed the teachings of our vegetarian friends, we shall find in many parts of the world, equally strong enduring bodies fed solely upon vegetables and those in much smaller quantities that the American is accustomed to take. So our conclusions resolve themselves into this: A healthy home means on the part of some one a knowledge of the laws governing food and its principles, its quantity as well as quality. A knowledge of sanitary ventilation, of drainage and surrounding conditions, but first, last and most important, food and pure air supply of the best—and best prepared. How many mothers are ready to give sometime to this study? It is more important for our farmers' wives than city women for they are giving us the brawn and brain of the country. Mrs. Milner will be glad to communicate with any who are inquiring how even farmers' wives can begin the study of healthy homes.

Atwater, in a late paper entitled, "Investigations Needed as to the Chemistry and Economy of Foods," says: "The coming fad is domestic science; indeed, it is not coming, but has already arrived, and the danger is, that it may go as a fad, and leave no permanently useful impression. There is less danger of this since our clubs and societies are making the

pursuit of health the corner stone of their new creed. 'All that a man hath will he give for his life.' Mortality among all classes, particularly young children is becoming so alarming that a spirit of investigation is abroad in the land. Club women ever on the alert have caught and pinned to their printed programs investigations new only in name, for as one of them says, some of us began the study years ago because it seemed the only untried pathway left to good health, and finding the pursuit has led to the desired goal, why should we not persuade our friends that they also come into the kingdom. The Springfield Economic Club from which this paper comes, has not taken up a fad, but has purpose back of its early efforts which means better health, more happiness and added years for those who enter it. As this club is one of the few wholly devoted to domestic science and health study and based upon an original plan, we give briefly its history.

It was organized in September, 1898, federated at the time of the Annual Federation of Missouri Clubs, as a band of eight neighborhood circles, independent in leadership, yet united in a common plan and purpose, holding a monthly central union meeting. The plan combines the club with the social settlement. It is proving eminently successful showing to-day ten circles and very nearly 150 members. Its study has been given largely to the subjects in home life which touch most closely upon health. Its "Year Book" has been placed in the hands of Mr. Atwood, giving to those present who care to investigate their topics and constitution and it has introduced the use of whole wheat bread into scores of homes and millions who did not consider it worth while to manufacture whole wheat before are putting in machinery and offering new brands of whole wheat products to consumers. One of these has been named after this club.

BUSINESS METHODS IN HORTICULTURE.

By Z. T. Russell, Carthage, Mo.

I have been expecting to attend the meeting at Pierce City and to prepare a paper to read as per printed program, but on account of sickness in my family and pressure of work, I am compelled to give up the idea, but will send you a few lines, however, outlining in a very crude way the ideas which I would have liked very much to have been able to present to the meeting in a more complete and systematic manner.

There is one method that is very generally adopted and well carried out by berry growers, and to this portion of horticulturists I will confine what I have to say at present, that is different and without good reason therefor. I think, from the methods adopted by other classes of business men in other lines of business try in various ways to hinder others from engaging in the same line of business as themselves and hamper them in all the ways they can. They form great trusts for the purpose of controlling prices and shutting out competition; they limit the number of apprentices that one may have in some lines of business and in other and various ways make it difficult for others to enter competition with them.

But how is it with the berry men? They spend their time and their money in holding meetings to which they invite their neighbors and all others whom they can induce to attend. They then read papers and tell about their business and try to persuade all their neighbors to go to raising berries. Isn't that so? We all know it is. Is it business? I think not.

What would be thought of men in other lines of business who would do as we have done? Who ever heard of dry goods men, grocers, hardware men, railroad men, bankers, butchers, lawyers, doctors, or editors holding a meeting and laboring with tongue and pen with a view of inducing others to embark in the same business as themselves. Who, of all these, would spend his time and his money trying to get some one to enter into competition with him and to start up in the same business on the next corner? Not one. Who, of all the above, would spend his time and his money to instruct all who will read or listen in all the details of his bus-

iness free of charge? Do they do that? Not much. Then if others do not do this, why should the berry men? Other classes of men keep their business to themselves, then why should the berry men be so often bragging about their business and the great profits to be derived from its pursuit? I believe that nearly all of those who have been extensively in the berry business in the southwest for some years must admit and know that there is no longer any large profits to be made at it and that we have long since reached the point where boasting and all efforts to increase the acreage of strawberries should be dropped. There is profit in growing berries up to a certain point. If the amount thrown upon the market goes beyond this point then prices decrease in proportion to increase in amount of berries beyond this point and this continues until all profit is wiped out. Nor does it stop here, but continues right on, if the amount of berries is sufficient, until there is nothing at all left for the grower—except loss, disappointment, despair and ruin. Hadn't we better stop and think a little about what we are doing and why? What are we in this business for anyhow? Judging by what we see and hear in the horticultural papers and at horticultural meetings on the one hand and what we read in commercial reports and metropolitan daily papers on the other hand many of us are in the business that we may boast and gain the applause of men. And verily we have our reward.

The idea seems to prevail with some that we should induce others to raise berries and that we should instruct them and aid them all we can from motives of philanthropy or helpfulness, and those who hold this view usually become vain and imagine themselves great men, but the time has gone by, in my opinion, when a man should be persuaded to enter the business of commercial berry growing any more than he should be persuaded to adopt the profession of a blacksmith or a carpenter. In short, the time has come for us to leave off our foolish sentimentality and to look upon our profession as a business and to treat it in all respects as a business—just as other business men look upon their business.

Now, who is interested in having vast amounts of berries produced? Why everybody else more than the berry men—the railroads, the express men, the commission men, the dealers, the consumers, and the editors and publishers. Why do they want more berries? The editor and publisher wants more because it takes more people to raise them and of course they

all have to read horticultural papers. It is a matter of business with **him**. People who consume berries and produce none want them as cheap as **they** can be had. It is a matter of business with them. Commission men and dealers as a rule, are not benefited much by having too many berries and hence they often warn us against extreme over-production. What interest have railroad and express men. Is it from a spirit of helpfulness toward the growers on their part? Not to any alarming extent that I know of. They charge just the same for poor berries that they do for good ones, just the same for berries that sell for fifty cents per crate as for those which sell for \$5. Then in what direction does their interest lie? Why, plainly the more berries raised the more money for them. It is simply a matter of business with them and they can well afford to adopt a liberal policy toward editors, and all others who have influence, and who will use that influence toward inducing others to raise more berries.

Now what is to the berry grower's interest? First, raise much less berries and much better ones; second, look upon our calling as a business by which we are to gain a living and possibly to lay up a little for a rainy day, just as the people of all other callings do, and stop our foolish boastings and imaginings on account of the supposed Good Samaritan features of our business, and third, to give less comfort and aid to all such as by sophistry and flattery would induce us to increase our acreage to such an extent that the grower himself is the only one concerned who is absolutely left without a profit.

Z. T. RUSSELL.

Music.

Forester's Horn.—Quartette.

SOME THOUGHTS ON HORTICULTURE.

F. H. Speakman, Neosho, Mo.

When asked by our secretary some time ago to prepare a paper for this meeting, it was my intention to take some fruit as the subject of my remarks, and in looking over the program I find the raspberry has been given to me. But I am not going to tell you how to grow raspberries, or what varieties to plant. To be plain about it, I do not know. The more experience I have the more cautious I am getting to be in recommending any fruit or treatment for it.

I have cultivated thoroughly and seen others neglect their strawberry plants. I have even gone further and predicted failure for them on account of it, only to find that the failure came nearer being realized by myself than by them. I have been laughed at, at the time, for making statements concerning the condition of peach trees after the extreme cold of last February. I say, at the time, for now it is my turn to laugh in this case, but for quite a while it did not look as though my turn was coming.

Never so much as now, after the opening of another fruit season, has the fact that all rules in horticulture have their exceptions been so forcibly brought to my notice. With this thought in mind the remarks that will follow will not be confined to the outlining of any work in this broad field of ours, but rather to pointing out, if I may, some of the many influences which have their bearing upon the growing and marketing of the fruits of the garden and the field, and the causes which produce results either satisfactory or unsatisfactory to the fruit grower.

In the outset, I will say that I do not wish to leave the impression in anyone's mind that I would advise drifting, or working without a well devised purpose and definite aim. We must read, study, think, yes, and even anticipate. Many rules are good, but the exceptions to them would sometimes seem to prove their value. All this only shows the importance of developing the capacity (as it were) to properly digest the food that is continually furnished to our minds, or, in other words, grasp and weigh any new situation or condition produced by one or more of the many causes that may exist.

Not only does the weather, which is the subject of so many comments and remarks by all, and which so uncomplainingly bears the blame for a large number of the failures of the tiller of the soil, have its effect continually registering itself upon our plants, trees and their fruits and also upon the insects and fungi which prey upon them, but in this complex system of living of ours, other conditions as well exist which, while not affecting directly the production, do not affect the marketing, which really is the greatest problem now presenting itself for our solution.

In planting, even after years of experience, we may well be at a loss to know what to say when asked, even by a neighbor, what varieties of fruit to set out. What a slight difference in the condition of the soil chemically, or in its fertility, or in the moisture it holds, may do for a plant or tree is hard to calculate, particularly where weather conditions have such a wide range as in Missouri, and in fact in the greatest part of the world where fruits are produced.

In our continual efforts to find something better than what we are growing we must give those new fruits which are ever being introduced and which we believe would do well in our locality a trial. This of course is the work of the experiment station, but we must all be experimenters to some extent at least if we would know what is best suited to our soil and conditions. Having done a little work of this kind myself I can now say that it is truly surprising what grand fruits a very high price for the plants or trees or the method of their propagation may sometimes develop. Of course nearly all of these new things will prove of no value to us, having either degenerated so rapidly after being sent out by the introducer or propagator that they have become worthless by the time they should bear fruit for the planter, or to take a more charitable view, have journeyed so far from the favorable influences and conditions surrounding the place of their birth as to become as stated. Particularly are these things to be noticed in the strawberry, while the tree fruits are much more to be depended upon.

Notwithstanding the disappointments that must of necessity attend this work if it is carried on in a small way, it may result in much good and is a source of a great deal of satisfaction to the one doing it—satisfaction not only in occasionally finding a good thing, but in being able to know of those that are worthless as well.

As I stated in the beginning of my remarks, the marketing is the hardest problem to solve in fruit growing, except where one is situated so as to use nearby points to advantage, which of course greatly simplifies the matter. But many of us are not located so as to do this, to any extent at least, and must depend upon shipping in one way or another, and here is where many complications are to be met. It is not enough now that we understand the business at our end of the line, but that at the other is equally important. The selection of good houses to handle our products in the markets that are naturally ours; to protect these houses by supplying them with a certain amount of fruit or vegetables, as the case may be, and to require their protection as well, is necessary, in my opinion, for satisfactory results. But even these things, good as they are, will not, by any means, always give us success, for other houses in the same markets will of course make the arrangements that suit them best and that they can make. And so if harvest is large prices must of necessity be low, particularly when quickly perishable products arrive in bad condition through the fault or misfortune of the railroad, refrigerator or express company, either in delay or bad service, or, as sometimes happens, through the ignorance of the grower himself in either packing, cooling or loading his product.

I will not enter further into the problems of either transportation, refrigeration or distribution and will leave other matters bearing upon the subject of horticulture untouched. However, in conclusion, I wish to say something that I feel to be a verity, namely, that all of us, everybody—even including the railroads, express and commission people—should busy ourselves in overcoming the selfishness by which we are bound and which stands so much in the way of a proper adjustment of things on earth. Surely no one should more fully recognize the importance of this than the fruit grower, whose life of close contact and communion with nature in her various workings—always seeking to give expression to the perfect—should lead him to see plainly the work given to each one of us to do.

Music by Kreyer Orchestra.

Recitation by Miss Persis Barber.

Song.—Dreamland. Quartette.

H—10

FRUITS FOR THE FARMER.

By J. A. Kennedy, Ravanna, Mo.

The subject of "Fruits for the Farmer" being assigned me for a paper to be read at the next meeting of the society suggests to me that in order to meet the wants of the present time to the best advantage, I ought to give my attention to the selection of a farm orchard. Farming and fruit raising are separate occupations. The farmer needs an orchard only for family use, sufficient to supply the household demands, and he wants them so selected as to have fruit as near the year round as possible, from the earliest ripening to the latest keeper. He wants the hardiest and the surest and in connection with this he wants as good a quality as is attainable with good yield and sure bearing. The qualities to be considered are for eating, cooking and drying. One hundred trees would be a large orchard for family use and probably more than would get proper attention from a man whose business is raising grain and stock, the source to which he looks for the wherewith to meet the immortal tax, and his other necessary obligations. If a man attends closely and strictly to his farm, he is apt to neglect his orchard. He is most sure to slight one or the other, and it is very apt to be the other.

Drawing from the knowledge of my limited experience, I would plant for a farm or family orchard in this county about the following varieties and numbers of each in an orchard of one hundred trees: Commencing with the earliest bearers, I have found it would be the Red Astrachan. It has good cooking qualities and is a fine large apple, but is no keeper, and it is a shy bearer. I would plant from three to four trees, followed by about two each of the Red June, Sweet June, Duchess, Summer Pearmain and Cole's Quince, the latter for its special good cooking qualities, which commences as soon as it attains to any considerable size, the Pearmain for its good eating qualities. The Cole's Quince is also a good bearer. For variety and beauty as well as good bearing and general use a couple of Shenango Strawberry might find a place. These I would succeed by about the following number of fall apples in regular order as follows: Two Autumn Swaar, two Maiden Blush, four Lowell,

four Porter, two Alexander, two Wealthy, four Famuse, and two each of Transcendent and Whitney Crabs. The Lowell and Porter, are fine large apples, excellent bearers, stick well to the tree and are unexcelled for drying purposes. The Alexander makes a fine show and is a good cooker. The Wealthy is a very desirable eating apple. The Famuse is a prolific bearer and, with proper care will last for eating purpose until Christmas. For winter and good keepers I would make about the following selection: Ten each, Ben Davis, Jonathan, and Willow Twig, with about six each of Dominie and Vandevere Pippin. These are all hardy, sure bearers, commence bearing young, and yield well. The Vandevere might be said to be a little shy as a bearer, but its fine size and most excellent cooking qualities and also for drying, makes it worthy a place in a family orchard, for Mercer county. Stewed Vandevere makes the very best sauce for table use, try it and you will have no use for apple butter while the Vandevere holds out. The Dominie comes next in order in this line. The Winesap and the Janeton, one of the leading apples of the county, are on the wane. Of late years they have not been a success. A quarter of a century ago they ranked first in the county, as an all purpose apple. They were sure bearers and good keepers, but for the last few years they have not done well. Yet I would not hesitate to plant a few of each in an orchard of one hundred trees, they may come all right as the seasons change. The Jonathan is the apple for winter eating, succeeding the Famuse, the Ben Davis and the Willow Twig are good bearers and excel as keepers. They stand head in all points except quality, in this respect they fall far below all others, but when all others are gone they fill a good place and are always in demand. The Ben Davis is the all-purpose apple.

The cherry is a desirable fruit for family use during its season, and for canning for future use. I would plant from four to six Early May for first use, with two or three English Morello to succeed them. They are both sure bearers almost any season. Four or five Wild Goose plums might be added for variety, but plums and pears have not proved profitable for me. They are very good when you get them, but too much a prey to insects and blight to be profitable. Neither is there any advantage in giving much space to peach trees. A strawberry bed should be on every farm. I have found the Crescent one that succeeds well and

is profitable. The raspberry is a luxury that no farmer should deny himself. I would plant 100 improved black cap. They are always on hand with the season, and are excellent for canning. A blackberry patch should find space on every farm. While the Snyder is not quite as large as some other varieties, it is the best in quality and always there. No winter has ever frozen the tip of a cane for me; all others that I have tried have been injured or killed by severe winters, but the Snyder never fails. It is the all-purpose blackberry. By all means have a good patch of Snyder. Give a place also to gooseberries and currants. For setting trees, have the ground well prepared with plow and subsoil, set either fall or spring, or both. Go to the nursery and select your trees with care. Two or three year old trees are the best age for transplanting. Pay no attention to ignorant and irresponsible "tree dealers," representing themselves as agents for some nursery. The county has lost thousands of dollars by listening to these agents. If there is no home nursery within a day's drive of you, make out your bill and send it to some responsible nurseryman. He will take pleasure in filing your order and shipping them to you in good condition. Set your apple trees with care, about twenty feet apart; cultivate the young trees well, and look after the borers. Protect against rabbits and do not pasture your cows in a young orchard and when your trees reach the proper age you will be rewarded for all your labor and care.

Vocal Solo.—He Has Plowed His Last Furrow. S. E. Bruff.

HOW TO KEEP THE BOYS ON THE FARM.

By J. C. Evans, Harlem, Mo.

It would seem to all who read and talk that this subject would sometime become threadbare, yet until we have discovered a remedy we must continue to write about it, talk about it and discuss it, although when some of the brightest minds in the country have exhausted their ability

and failed there is little encouragement for the members of a horticultural society to undertake the solution of it. I sometimes think that one reason a remedy has not been found is because, as a rule, the best writers and thinkers are of a calling other than farmers and are not sufficiently interested in the welfare of the farmer's boy to undertake the solution of the question. It is a fact that until recently the educators in all our institutions of learning, save in part the agricultural colleges, have given very little thought to the farmer's boy or his special interests. But they are to be blamed only in part for the laws (at least in Missouri) and the rules and regulations of all the higher institutions of learning practically bar the farmer's boy from obtaining the education that would cause him to love the farm and remain on it.

It is a fact that a majority of the farmer's boys at the age of sixteen or seventeen, when they have got the little that they can get in their small country school, and that in a direction from, rather than to, the farm, are inclined to go away, some to the cities, some to the railroads and some become professional tramps. I have in mind one who left the farm at not quite sixteen and brags that he tramped 2,500 miles without a cent of money or a change of clothing. Had he been properly trained at home and received the right kind of an education in his school he would not be so inclined and there would yet be some hope of making of him a useful man, but I fear he has gone too far now and that it is too late to make anything of him.

It is gratifying to write that the question of elementary agriculture in the district school is now being so thoughtfully agitated all over the country and that many of our foremost educators are indorsing it and some of the states have already adopted it. The district school is strictly the farmer's, it is his high school, his college, his university. A large majority of farmer's boys can not hope to get anything more in the way of an education than they get in their district school. After agriculture is introduced and boys have finished in the district school and acquired a taste for such an education many of them will go to some agricultural college and acquire that degree of educated intelligence that will cause him to appreciate, love and enjoy the farm and enable him to run the farm with a greater degree of pleasure and profit. This little taste of agriculture and horticulture in the common schools will be like the ava-

lanche on the mountain side, only the boy who tramped 2,500 miles might have gone to the top instead of the bottom. Then let us hasten the time when agriculture and horticulture will be taught in all the district schools in all the states.

There is a growing demand for a better education, one that will give to the boy special thought and inquiry, and this can be acquired only in the public schools. This will give a new impetus to the demand for that more thorough and practical education, which can only be acquired at a first class agricultural college. An eminent wit once said the school is a big thing and the chief business of life is to educate children. Let us be thankful that there is a growing realization that this was a truth. We should be proud of the fact that this society has a standing committee on education and that they are actively and earnestly working to this end. Let us hope that their work and the combined efforts of so many who are taking a lively interest in the matter will ere long solve the problem. Let us with pleasure look forward to the near future when farmer boys and girls will be educated to the farm instead of away from it.

WHAT TO DO WITH THE SURPLUS FRUIT.

By Mrs. W. B. Chambers, Republic, Mo.

Some irreverent person has said that when Eve ate the forbidden fruit in the Garden of Eden, she was merely tasting different varieties of apples, hoping sometime to own a fruit farm in Southwest Missouri.

Be that as it may, since that time there has been more or less interest in fruit growing.

"What to Do With the Surplus Fruit on the Farm" is a subject of such magnitude and so many possibilities that I do not feel competent to handle it. A great variety is included in canning, preserving, pickling, etc.

Canned fruit is a great improvement on preserving, being much more economical and requiring less time. Canned fruit can be prepared in various ways, using sugar or not, as best suits the kind of fruit you are

using. Fruit for canning should be carefully selected, using only the perfect fruit, free from bruises and not too ripe, cooking only long enough to thoroughly heat the fruit and sealing boiling hot in air-tight glass jars.

Another way, is to preserve the fruit, but, unlike the canned fruit, may be made of that which is too ripe for shipping. In this we use from one-half to an equal quantity of sugar, cooking carefully until the syrup jellies. Such preserves can be kept for several years.

All small, imperfect berries, peaches, etc., can be made into delicious marmalades and jams, and when put up in neat, attractive shape are in good demand. A slight covering of paraffin prevents mold.

Another way to use the imperfect fruit is to make it into jelly, using equal parts of fruit juice and sugar, and putting into jelly tumblers with close-fitting tin tops.

Still another source of revenue for the fruit grower's wife is in making good pickles. The principal pickles of this country are made of cucumbers, but an agreeable variety may be made of different green vegetables, like green beans, cauliflower, small onions, green tomatoes and young melons. Cucumbers for pickles should be gathered every day, taking great care to have them of uniform size and appearance. Prepare a jar of strong brine, and every morning wash the cucumbers as they are gathered and put into the brine, keeping them well under with a heavy weight. When you have the desired quantity soak them twenty-four hours in fresh water and add spiced vinegar, hot. Keep in glass jars or bottles corked tight. Apples, cherries, small pears can be utilized by drying, and if carefully done make a pleasant change for the family and find a ready sale.

Not long ago, while taking an order from a hotel proprietor, he asked if I could dry sweet corn, saying he much preferred it to canned corn. Many housekeepers prefer to buy home-canned tomatoes in glass to using the factory-canned in tin. A lady acquaintance of mine, suddenly thrown on her own resources for a living, was appalled to find, on taking an invoice of her talents, that she only knew one way to make money. and that was making excellent jams and preserves, and from a sample sent to a large hotel, now makes them in large quantities. Another lady in a distant state furnishes a large grocery house in Chicago with choice home-made pickles.

Still another source of income is in making pure wines. Grapes, currants and blackberries all make fine wine with very little trouble or expense. A very nice wine is made of rhubarb and is preferred by some to wine made of fruit, and it is easily made.

Last, but not least, comes the old-fashioned apple butter, and while it certainly requires the patience of Job it does not need the wisdom of Solomon. Pure cider vinegar is always a salable article and can be made of the unsalable apples and if not sold will be in demand another season for the above mentioned pickles.

Recitation by Miss Jessie Clement.

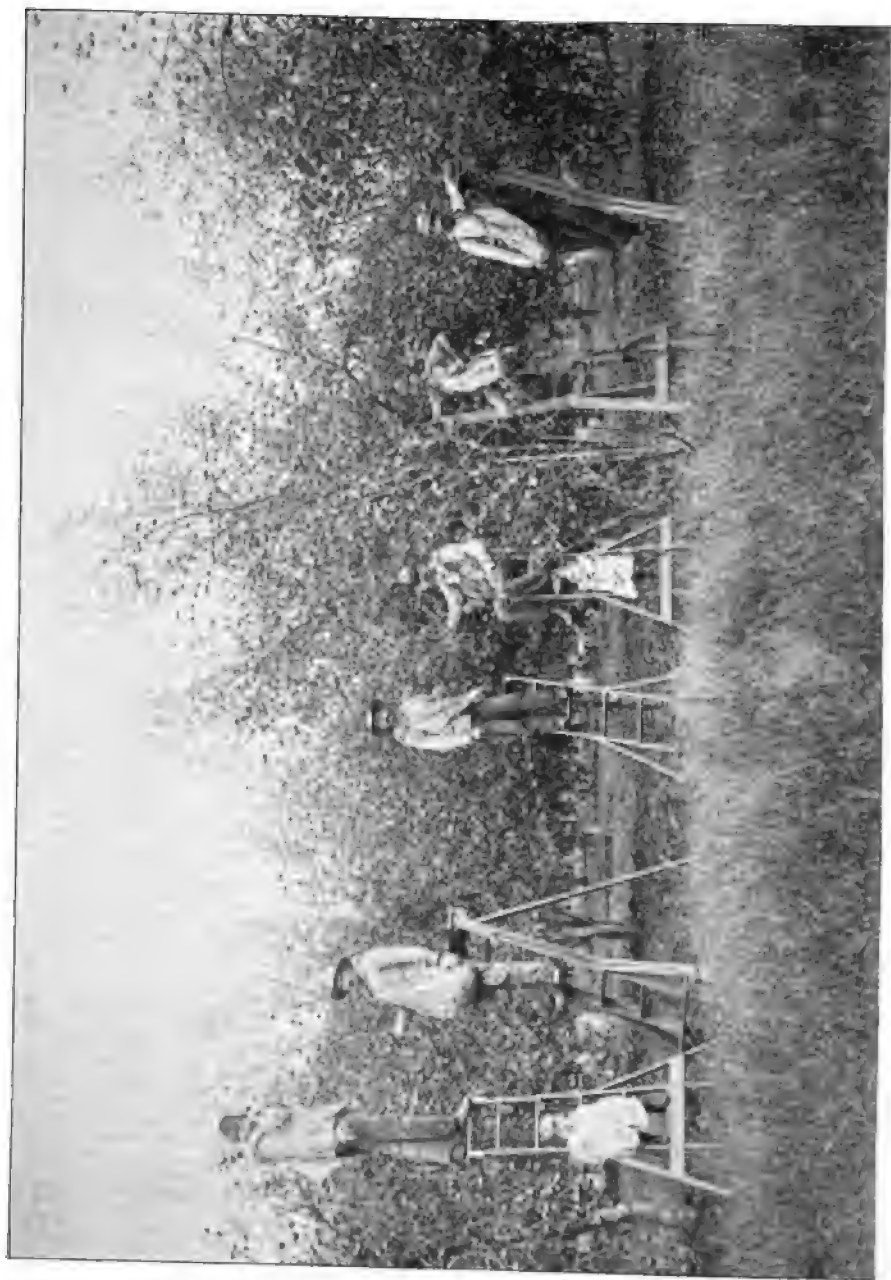
FINAL RESOLUTIONS.

Mr. President and Members of the Missouri State Horticultural Society:

We, your committee on final resolutions, beg leave to report the following:

Resolved, That for the great success of this meeting the society hereby tenders its thanks to the citizens of Peirce City for the hospitality with which the society has been welcomed to their homes; to the local horticulturists for their efforts to awaken interest in the meeting; to the committee on decoration for the beautiful manner in which the hall was decorated; to the Kreyer orchestra and the Peirce City quartette for the fine music rendered; to the elocutionists for recitations given; to all who have aided the society in making the meeting a success by presenting papers; to the hotels and railroads for special rates, and to all who have by their presence and assistance aided in making the 1899 summer meeting one of the best ever held in Missouri. Your committee beg to acknowledge the society's obligations.

LEVI CHUBBUCK,
F. E. ATWOOD,
WILLIAM H. BARNES.



GATHERING APPLS. W. T. FLOURNOY, MARIONVILLE, MO.

LAST WORDS.

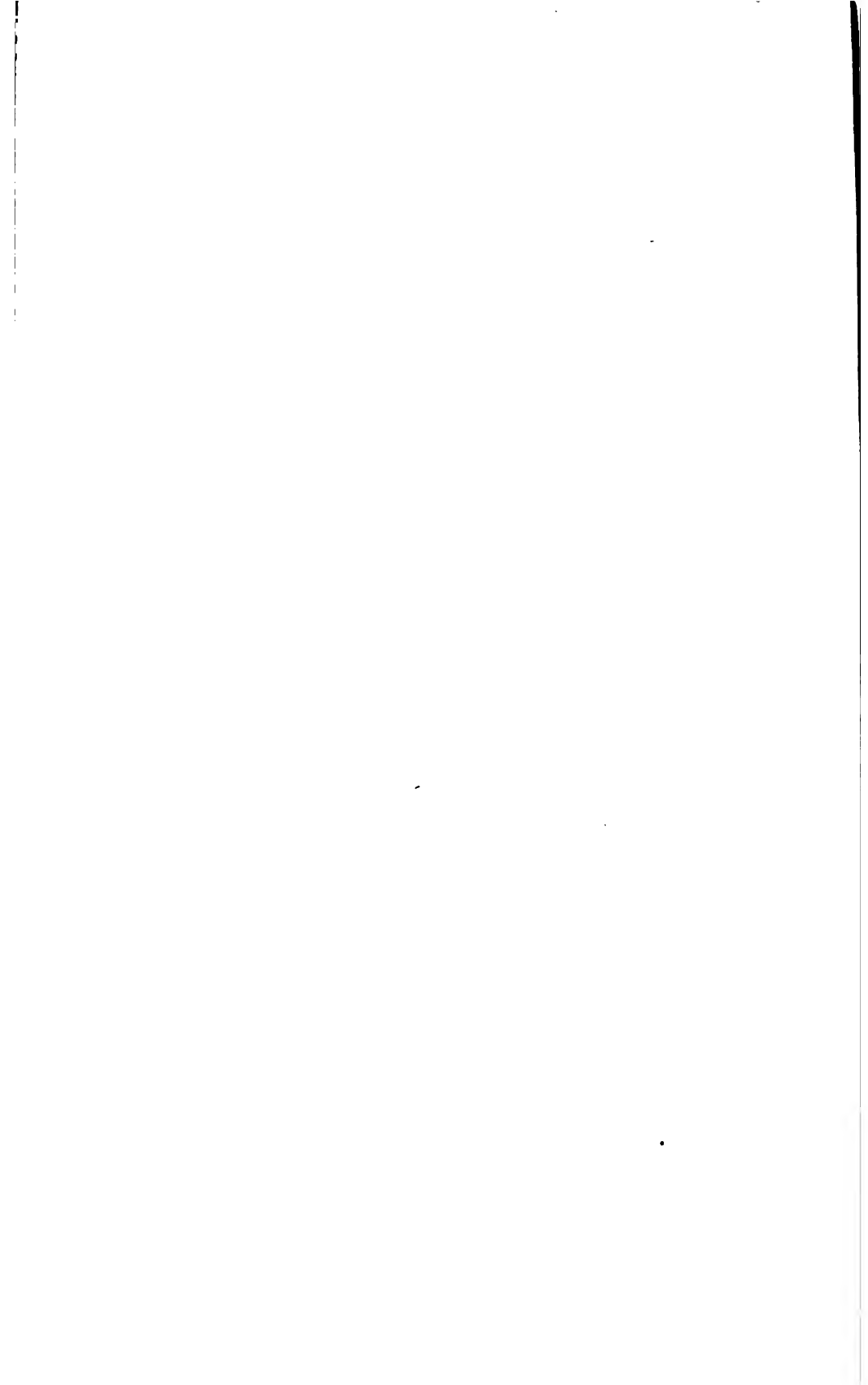
Wm. H. Barnes.—It is a pleasure for me to meet with the Missouri Society and I shall make it a point to be with you at two meetings a year. The meeting has been a happy one and we have learned many new things. There are no lines in horticulture of state, or religion, or politics, we desire to teach people to live better and eat better. All women are horticulturists for they all love flowers. If you like to eat apples or watermelons, you are a horticulturist. We work for the good of humanity everywhere.

G. A. Atwood.—I emphasize heartily the resolution appreciating the hospitality of Peirce City. This is a most enterprising public spirited town, and we are proud of her in southwest Missouri.

Pres. Murray.—Time for adjournment has arrived. I desire to express my sincere and heartfelt thanks for the way the people of Peirce City have entertained us, for the music and drives around your pretty city. This has been a grand, good meeting and I hope good will come from our convening with you and that you will keep up this work and I hope we may meet again.

On motion, the president declared the meeting adjourned.

WINTER MEETING AT PRINCETON.



WINTER MEETING AT PRINCETON.

FORTY-SECOND ANNUAL MEETING.

Held at Princeton, Mo., December 5, 6 and 7, 1899.

The Missouri State Horticultural Society held its forty-second annual meeting at Princeton, December 5, 6, and 7. The meeting was a good one, although not as largely attended as have been some of its predecessors. The people of Princeton did all possible to have the visitors feel at home. The display of apples was very good, considering the season, and the fruit was taken in charge by Secretary Goodman, to be sent to the Paris exposition next year. The society resolved to put forth every effort to have a good display at Paris, and also at Buffalo, N. Y., in 1891.

All the old officers were re-elected, and the constitution was amended making the offices of president, vice-president and treasurer for one year, with a limit of two successive terms for any person in either of these offices.

St. Joseph, Mexico, Springfield, Farmington, Chillicothe, Macon, Kirksville and Lebanon asked for the next winter meeting of the society and the question of place for the next summer and winter meeting was left to the executive committee, with a provision that railroad rates should not exceed one fare for the round trip.

Messrs. Callaway and Baxter, of Illinois; Stinson, of Arkansas, Holsinger, of Kansas, and Emerson, of Nebraska, were delegates from other states.

The meeting was called to order Tuesday evening, all the officers being present except Treasurer Nelson and Second Vice-President Samuel Miller. Many of the delegates arrived on the night train.

FIRST SESSION—At 8 P. M., Tuesday, December 5, 1899.

The meeting was called to order by President Murray and Rev. C. W. Coons delivered the opening prayer.

The K. of P. Cornet Band varied the program with good music during the evening.

The welcome was presented by Hon. Martin Read.

Mr. President, Ladies and Gentlemen:

Owing to some indisposition on the part of the mayor of our little city, I am requested to give you an address of welcome. Pioneers in any country, business or calling are usually the truest, bravest and best of their kind. The pioneers who settled America were the strongest, bravest and best that ever lived in America. Horticulture is represented here to-night by its pioneers. Horticulture is probably the most improved branch of agriculture. These gentlemen and ladies are engaged in the pursuit of Horticulture, and you may say they have done it for profit. Yes, and for more than profit; not only for profit, but for the purpose of developing it, and the resources with which nature has endowed our great country. They have stuck to it, with or without profit. You can honor them as they have honored you. We give them cordial and kindly greeting. These people are here to enlighten you. You can be profited by hearing them. In behalf of the people we extend to you, Mr. President, and all the members, the hospitality of the city. We are glad to have you here, and extend to you every courtesy, a hearty welcome, and a cordial greeting.

RESPONSE BY PRESIDENT N. F. MURRAY.

I return our heartfelt thanks for the kindly greeting you have given us. We thank the Mercer County Horticultural Society for its kind invitation to hold our forty-second annual meeting in your city. Only two years ago I was here to organize the Mercer County Horticultural Society. That work has been a grand success. The display at your county fair, at this meeting, and these fruits show that it pays to have a horticultural society in your midst. Our state society has

always been controlled by the missionary spirit. We hold our meetings over different parts of the state to awaken an interest in horticulture in the parts of the state which we visit. We have been very successful in this work, as there are now over fifty county and local horticultural societies in the state. While our work seems slow, it must be remembered that we have had to work under many difficulties, and different conditions. If we will look back and take a careful review of the progress in horticulture in recent years, we have every reason in the world to feel proud of our success. We have numerous medals to show that Missouri fruits have always carried off the highest prizes at all the great fairs and exhibitions. This could not have been done without organization. We are soon, if we are not now, to be recognized as the greatest horticultural state in the union. West of the Mississippi we have twenty states and four territories, with twenty million people. This vast territory has been developed from a wilderness into a fertile land. As the country grows older conditions change. It requires 30,000 acres of land to support a savage; 10,000 for a cattleman; 1,000 for a wheat grower; 160 acres for a mixed farmer; while ten acres will support a fruit grower and his family.

We meet this time under unfavorable circumstances; we have had dry years, wet years and cold years. This has been very discouraging to the fruit grower. But we must not give up. It is said that Henry Ward Beecher, after a storm gave thanks. When asked why he did this, he gave as his reason, "We shall now have better weather." So many trees were killed by the past cold winter that I doubt if there are enough trees in all the nurseries in the country to replace them. The demand for fine fruit is constantly growing. I believe this is a good time to go forward, to plant more trees and to care for them better. We are now down in the valley of adversity, but we are going up higher. I believe it will pay to enlarge, replant, and take better care of the orchard. In 1800 there were only two nurseries in the country; in 1850 there were thirty-two; in 1895 there were more than 4,000. Our markets are growing; especially in the export

trade. Over one million barrels of apples were sent to Europe in the past month or November. The prospect for high prices is very satisfactory. In the summer I predicted that apples would be worth from \$2.50 to \$3.00 per barrel this fall. Yesterday I found them selling in St. Joseph at \$2.75 to \$3.25 for No. 1 Ben Davis; \$4.00 for New York Baldwins, and \$5.00 for home grown Jonathan and Grimes. At these prices they should be very profitable. I also found the Missouri persimmon in the market at fifteen cents per quart. If nuts can be grown in Italy, shipped across the ocean and sold in the United States for ten cents per pound, at a profit, we should certainly be able to grow them at a profit in this country, and surely none need fear the overproduction of first-class fruit; but we must have better culture and better care. We must foster and care for our feathered songsters. The horde of insects which prey upon our fruit must be overcome. We must handle our fruit carefully and put it in nice packages. We must be right at the front along these lines. We must try to excel if we want the European market. We must try to make a good exhibit at the Paris Exposition next year. Our worthy secretary, Mr. Goodman, Mr. Gano, Mr. Evans, and others, have some seventy barrels of apples now in cold storage at Kansas City for this purpose. We want to capture the French market. Now we do not send many apples to Paris, most of our exports go to England and Germany. We also want to make a show of our fruits at the Pan-American Exposition at Buffalo, New York, in 1901. In 1903, at St. Louis we must make the best exhibit the world has ever seen, at the celebration of the Louisiana purchase. So you see there is a great deal of work before us, in the near future, in the way of letting the world know of our wonderful resources and possibilities in the production of fine fruits.

I want to say that there is a great deal to be learned in horticulture. Some of us have been working at it for a life time; still we do not feel that we have learned much. We think we are just beginning to see the light. We find that in fruit growing one succeeds where another fails, and why? One knows how; the other does not. Let us communicate to each other our knowledge and experience. We have good horticultural literature. Let us spread it over the land. Let us adorn and

beautify our parks and home grounds. Nothing cultivates, refines, and ennobles so much as the pursuit of horticulture. A worn and weary traveler in a desert was about to give up in despair, but seeing a flower growing at his feet he took courage and said, "I will not give up, God is here." So, as horticulturists, God is with us, and we will not lose courage. He is with us in the trees, the flowers, and the beautiful fruits. We live in a state naturally adapted to fruit growing and we have many things to help us and light the way. Among these is the horticultural department of our State University at Columbia. Will we support that department, or will we let it perish? We send only about two score students from all the great State of Missouri. I am sure it is worthy of support. Encourage some of the young men and women to go there and take the short course in horticulture.

I notice in traveling over the state that the farmers' orchards are going down. The vast majority of farmers know but very little of modern horticulture. For that reason we should have young men from every county taking that course. They would go home and reinvigorate the fruit growing interest of the whole community in which they lived. We do not need to go wild and plant all our land in strawberries, as some have done; though these in a small way pay well. We should know of the great pleasure and benefit of growing enough of the high quality apples for our own families. Let every fruit grower have all the luscious fruits fresh from his own garden, strawberries, raspberries, blackberries, grapes and peaches, and so on, to the latest keeping apples, till strawberries come again.

Ladies and gentlemen: I want to call your attention to the importance of organization. We are living in a great age, and many of the greatest things of the age are possible only through organization. Wherever the fruit growers are organized and work together they get many concessions from dealers, shippers and railroads. If we are to make a success we must be organized into societies.

We have a vast amount of wild lands which we want settled and improved. There is no better country for the fruit grower than Missouri. I feel quite sure there are golden opportunities awaiting men

of small means in developing our cheap lands in the business of horticulture.

We have reason to be proud of our present attainments, but let us not rest contented; let us march onward and upward to better things.

The first paper on the program was by Vice-President Robnett.

AFTER CULTIVATION, GATHERING AND MARKETING.

By D. A. Robnett, Columbia, Mo.

This subject is one on which I have had so short experience that my paper must be short.

However, even in my short experience, I have learned that after cultivation, gathering and marketing, comes satisfaction and joy, or disappointment and regrets. It is safe to say that all depends upon how well the head-lines have been done.

Those who are successful in raising an orchard to bearing-age and gather a large crop are compelled to divide their success with many. For, how could we have had success without such wide awake men as our president, secretary, Messrs. Evans, Miller, Vandeman and others known to many of us. Many of our orchards would, long ago, have been deserted if they had not encouraged and helped us over the dark places. The satisfaction and joy that comes in the way of money for our first few crops, is nothing to compare with the pleasure we have in our future hopes. Destroy our faith in the future and our happiness ends.

There has not been a blooming season when I would have sold my prospects for twice what I realized at gathering time.

There is much pleasure in looking upon an orchard which has had the same care and thought that is given to a race horse or to a herd of fine Durham cattle. We can not help feeling proud when told by so many that we have a fine orchard. It works just like telling the lover of a fine horse that he has a fine one.

It is also a source of pleasure to know that we are giving employment to more people than if our land were in grass. Then think how many dear little children will be made happy by the red Ben Davis apples grown in an orchard of 100 acres.

Now comes glory, for, if we have the best commercial orchard in our county and care for it as we should, we are known by every man in the county and looked upon as a public benefactor.

Another grand thing comes to us all after cultivation, gathering and marketing—sober men and boys. I have been a member of this society for eleven years and have attended nearly every meeting, and I have yet the first member to see intoxicated. In fact, it is a rare thing to so much as smell whiskey. Now, can as much be said of our sister societies? I fear not.

Another joy comes in having all kinds of fruits, especially winter apples, for our families.

I have merely mentioned the money part, but must not pass it by, for without it somewhere along the way a commercial orchard would be a grand failure. Satisfactory returns come often enough to encourage us to go on. I am sure if we can figure out as good a profit in the apple crop in the past five years as in the wheat and corn we can hope for better in the next five years.

I set an apple orchard in the fall of 1888. The fall of 1895 I sold fruit to amount of \$600.00; the fall of 1896, sold \$1,800.00 worth; the fall of 1897, sold \$3,000.00 worth; the fall of 1898, sold \$500.00 worth of peaches and pears and my apples failed entirely. The fall of 1899, sold \$1,200.00 worth of apples, and I would be ashamed to tell this audience what I expect to get for my crop in 1900.

After dinner comes a nice dessert, so after cultivation, gathering and marketing come—the good things of the orchard.

Master Philip McDonald recited the selection which follows:

PLEASURES OF THE BLACKBERRY.

Formerly the blackberry was regarded as merely a bramble in this country. It is still quite generally so regarded. When a man gets to thinking it is not a bramble, all he has to do is to go waltz around in a healthy patch, with nothing on him but a cotton shirt and a pair of tow trousers, and he will come out restored to the faith of his fathers. The greatest enemy the blackberry has, is boys. Five boys, from town, can eat more green blackberries in a day than would ripen in a week. For many years the great desideratum has been a hardy berry that could resist the premature onslaught of boys from town. It is a great desideratum still. The Schneider, a variety that was invented by an Iowa horticulturist, is the nearest approach to it. It is bred from a perfectly gree persimmon, crossed with a dogwood tree and propagated with a hybrid of wormwood bush, and wild crab apple. It is not a perfect defense, but there are very few boys who care to eat more than a quart of them. Nobody else, however, can go past the field where the Schneider is growing, without being attacked by Asiatic cholera, and this tends to weaken the partial success this hardy berry has achieved. Then there is a bug—I do not know the name of it—that crawls over the berries now than then. When you eat a berry that has been glorified by a visit from this bug, you lie down in the briars and pray heaven to take you home in just about three seconds. And if you live, you can wake up in the night, along in the middle of next winter, and shudder as you taste the old taste of that berry.

When your blackberries grow too thickly, you will want to thin them out. To this end you must kill some of them. This can be done by digging a well where the plant stands; then turn the farm upside down, and let it dry out thoroughly for a couple of years, then turn it over, upside down, and start a brickyard on the back of it. This will kill off some of the plants. There may be some shorter and cheaper method of killing blackberry vines than this, but I never heard of it, and it isn't likely that there is any.

If you want to devote about forty acres of ground to the cultivation of blackberries, plant about three healthy vines in some corner of the field about the middle of April. Then about the first of May, the man who owns the farm on the other side of the road, will bring civil action against you, and try to collect damages for destruction of his two fields of wheat by a raid of blackberry vines.

It is not known just at what season of the year blackberries ripen. The blackberry has never been known to ripen. If the hucksters and boys should all die in June, it is probable that the berries would ripen sometime in July or August. But they never had a chance to see what they could do at ripening.

The blackberry is so named because it is blue, in order to distinguish it from the blueberry which is black.—Burlington Hawk Eye.

THE SIX BEST FLOWERS FROM SEED.

By Mrs. G. E. Dugan, Sedalia, Mo.

The theme assigned for this essay, will permit but one form of treatment, and the writer must of necessity convey to her audience merely her individual taste in the matter of floral selection.

As there are "many men of many minds," my choice of flowers may not meet and satisfy a general public demand.

To give personal preferences, with reasons therefor, will be the simplest task possible, but I shall not expect every one who hears this paper to concur in my individual views. My particular fancy runs to sweet peas, pansies, petunias, asters, nasturtiums, and poppies, in the order named. But it is hard to make a decided choice of these few with so many other desirable ones left off the list urging their claims. Nothing will take the place of scarlet salvia, cosmos, snap dragon, salpiglossis, and numerous other good annuals, but when it comes to limiting the list to six, those mentioned first are my choice.

I place sweet peas at the head of the list, because of their general usefulness, as an all-purpose flower. The sweet pea combines profusion of blossom with the sweetest fragrance, and daintiest coloring. There is nothing prettier for corsage bouquets, and they make very fine hand

bouquets with the addition of a suitable ribbon, and no flower that grows is superior for table or parlor decoration. The colors may be combined effectively, or simply massed in one preferred hue. They are always, and everywhere a graceful and popular annual. Their culture is not difficult if three arbitrary rules are observed: First, deep planting in rich mellow soil; second, early planting, as soon as the frost is out of the ground; third, a suitable wire trellis for them to cling to.

In this climate sweet peas should always be in the ground early in March. If it is not possible to get them in the open ground so early, they do well started in boxes and transplanted. Put them in a trench five inches deep, cover with two inches of fine light soil, mixed with leached wood ashes. As the sprouts appear bring the remaining three inches of surplus soil close to their slender green bodies. Cultivate the soil same as for garden peas, hoeing them when needful to keep down aggressive weeds, and grass. When the hot summer days come a light mulching of straw or leaves is useful to help hold the moisture and to keep the sun from burning them at the roots. Water freely and cut all the blooms every day until you get tired of the blossoms. This course of treatment will insure flowers until autumn comes.

Pansies are such spirited, saucy little flowers that every one loves them. They are the spoiled darlings of the floral world. When they lift up their bright little faces for admiration you smile down at them, no matter how world-worn or weary you may happen to feel.

A flat bouquet of pansies half hidden among dainty fern leaves is one of the prettiest forms of table decoration imaginable. They are pretty to wear also, but droop very soon unless they are placed in water. Pansies can boast the prestige of more sonnets than all other blossoms combined, except roses and lilies, and these are not annuals. To cultivate pansies, sow early in shallow boxes of earth in the house, or in a cold frame; if in the house, transplant twice to prevent spindling—the last time to the open ground. Soil for pansies should be deep rich loam, and the plants should be set quite close together, no more than two inches of space should be allowed between them. They require plenty of water; under the right conditions nothing can excel them in profusion of bloom. Like sweet peas, they must be gathered freely or they will go to seed and lie down. To have good pansies is some trouble, but they

are amply worth the effort. After the transplanting period they only require the weeds kept down. This must be done by the hand-pulling process. Cut worms and green aphids are the enemies of this flower. The first must be hunted for, and destroyed; the last may be treated in various ways. Spraying with a weak solution of paris green is a good method to get rid of them. No more than a table spoonful of the powder should be used to a gallon of water. "Slug Shot," a commercial preparation, will kill aphids, but it makes the plants and blossoms look dusty and disagreeable for several days after an application, for it must be used when the plants are wet, and it adheres tenaciously.

Petunias give a greater wealth and variety of color throughout the entire summer and autumn for less work and care than any other flower in the catalogue.

Merely sow petunia seed in any common light garden soil, just where you wish them to remain, and they will grow sturdily and bloom profusely until Jack Frost comes in real earnest to cut them down. Petunias are always attractive, and they have a delicious perfume which they seem to delight in wafting out on the evening air. A petunia bed in my garden last fall gave us more pleasure than all the other autumn flowers. The only care they need is to keep the weeds away from them. They do not require an especial amount of moisture and will bloom almost equally well in sun or shade.

Nasturtiums are regal things, so clean of foliage, profuse of flower, and so easy to cultivate. Persons who do not like them call them "vegetables," and one disagreeable man I happen to know, calls them "nasty sterntions," but I love them, always grow them, and would not exclude them from the choicest garden. They come with such a riot of color, fullness of life, and brightness of foliage, that I welcome them gladly, as I do the sunshine. Put the seed in the ground early—almost anywhere except among other plants. Each seed will make a fine, strong vine, or bush, according to variety, and will give cut flowers for the table all summer and fall. I plant the Tom Thumb kind; they bear as many blossoms and are more generally satisfactory than the climbing varieties.

These flowers will thrive in any kind of soil, and require very little care. Give them nooks and corners to themselves, or plant them

along borders, far enough from other plants to prevent crowding, for nasturtiums are rather selfish and aggressive—like some people—who are better if kept at a respectful distance.

Asters are of easy culture also. I find the best way is to plant the seed early in boxes or cold frames and transplant to the open ground as soon as danger from frost is past. Let the soil be light, rich and well prepared. Set the plants ten inches apart each way. I consider this flower almost equal to the best chrysanthemums. They have a great variety of rich colors, shading up from dark purple to the faintest lavender, and from deep rich blue to pure snowy white, from crimson to the faintest rose; in all these lovely gradations each plant remains true to itself, and is a miniature tree bearing dozens of fine feathery blossoms. They require very rich soil and a sunny situation, and to be kept free from the ever encroaching weed family. This is about all, except perhaps, to stir the earth about their roots occasionally. It pays to cultivate asters. No flower can surpass it in beauty or profusion of blossom. To my taste the aster is a veritable queen in the realm of Flora.

And now come the poppies, great flaunting, long stemmed, graceful silken robed things! They are among the wanton creatures of the floral world, but, ah! how beautiful they are!

A hedge of poppies is unlike anything else in the kingdom of flowers. They seem to woo you, to sway toward you, to lift bright, witching faces up to meet your glances, till you think of Cleopatra, Aspatia, Helen of Troy, and a score of other women famed for their beauty. Your thoughts come to you in verse, and you say

A scarlet poppy swaying on its slender stem,
A cup shaped poppy with a cap of gold,
Casts swift, bold glances at all passers,
Then flaunts silken skirts and cries behold! behold!

You feel a virtuous thrill in the presence of these wierd, shining creatures, and try to admonish them thus:

Ah! poppy with thy bright disturbing eye,
Fair poppy with thy soul destroying breath,
Flaunt not thy beauty which so soon must die,
Frail poppy think of midnight and of death.

Sow poppies the same as petunias. For their wealth of color, give them sunshine and air, then let them grow to gladden the waste places of the earth.

I write of flowers, and see their sunny faces
In all the lands where'er my feet have strayed.
In gardens fair, and in forlorn waste places;
In sunshine clear and in the softened shade.
I see them where chill mountain snows are falling
And where the Oriental sun beams bright,
I see them—aye—and seem to hear them calling:
"From Eden came we, just to give the world delight."

Mrs. Martin Read sang with a sweet and sympathetic voice the song "Hazel Drew," while the accompaniment was played by her young son.

The program closed with a paper on "Forestry for Missouri," by D. C. Burson, of Kansas City.

SECOND SESSION— 9 A. M., Wednesday, December 6.

After the meeting was called to order by the president, Rev. I. R. M. Beeson offered prayer for the day.

The secretary read a telegram of greetings from the Minnesota State Meeting in session at Minneapolis and a message was sent in return greeting the fruit growers of the north.

The names of visiting delegates were read and the following gentlemen stood for introduction and recognition: Mr. L. H. Callaway, of Bethel, Ill., delegate from the Illinois State Horticultural Society; Major Frank Holsinger, Rosedale, Kansas, who represented the Kansas society; E. J. Baxter, of Nauvoo, Ill.; Prof. R. A. Emerson, of Lincoln, Nebraska, Agricultural College; and Prof. J. T. Stinson, of the Arkansas College, at Fayetteville, Ark.

The following committees were appointed:

ON FRUITS:—

- F. Holsinger, of Kansas.
- E. J. Baxter, of Illinois.
- J. T. Stinson, of Arkansas.

ON FINANCE:—

J. C. Evans.

K. B. Wilkerson.

W. G. Gano.

ON NEW FRUITS:—

Prof. J. C. Whitten.

Prof. R. A. Emerson, of Nebraska.

L. H. Callaway, of Illinois.

ON OBITUARY:—

A. H. Gilkeson.

J. T. Snodgrass.

T. R. Peyton.

ON FINAL RESOLUTIONS:—

J. M. Irvine.

J. P. Canaday.

N. O. Booth.

The subject of "Orchards" was taken up in papers and discussions.

THE APPLE.—GROWING, PRUNING, DIGGING AND HANDLING.

By J. P. Sinnock, Moberly, Mo.

Mr. President, Ladies and Gentlemen:

The subject assigned to me is one that I have been interested in for twenty-five years, and have been making the best practical use of it under the circumstances. Sometimes we get discouraged after such winters as we had last winter, but God, the great ruler, who knoweth all things, knows best.

GROWING.

The apple seed is planted and cultivated one summer, dug in the late fall, packed away in the cellar ready for grafting; then we go to the scion orchard, cut this summer's growth, tie them up in bundles,

label each variety, pack away in the cellar in sawdust. We are then ready for grafting, which is fine work for the nurseryman during the cold weather. Our grafts are made and packed away in boxes with sawdust to callous, and by spring are all knit together and buds swollen ready to push out. The land must be good and well drained, not too rolling, that will grow a good No. 1 crop of corn. Plow it deep late in the fall and rebreak it in the spring as soon as it will do to work. Pulverize it fine and you are ready for planting grafts. Mark off the ground with a line in rows three feet, eight inches wide, plant with steel dibbles eight inches apart in row, making each plant firm in the ground, put stake to each kind, marking plainly the name of each variety. The cultivation must now begin, which is the main thing in the nursery business. As soon as our planting is completed we start the Planet Jr. Cultivator. Stirring the ground shallow every few days, and allowing no young weeds to start, and as soon as the rows begin to show a few weeds, we throw the dirt away with a small diamond plow, leaving a three to four inch strip which we work out by hand, being careful not to loosen a single plant. You must also run the diamond plow very shallow. In a short time the cultivator must go over again and level the ground. Keep the cultivator going, and when ever the rows need working, use the small diamond and the hand work, or if you find it too hard on the hand use hoes, being careful at all times not to loosen the young plants. Continue the cultivation up to the middle or last of August, then hill them up with the disc cultivator for the winter. The next spring stir the ground deep as soon as it will do and if cloddy, run over it every few days until you get it thoroughly pulverized. When ready to hoe throw away the dirt with the small plow and hoe, leveling off in a few days with the cultivator, the work must be continued and not a weed allowed to grow. Keep the cultivator going and do not allow the growth to stop until you are ready, say the last of August. This will bring you trees in October, ready for market.

PRUNING.

The first season there is but little pruning done, until late in the fall or early the next spring. Trim each young tree to a straight

whip, cutting back the very small ones to the ground and let them take another start. When the young sprouts and limbs come out and get about one inch long you put on a leather glove and rub each tree about two feet high; you can trim a good many thousand a day in this way, and it leaves them nice and smooth. If at any time you find anything to come off the body, break or rub it off while young and tender. Sucker the little ones you cut off at the ground to one sprout and you will find it will make a fine tree by fall, much better than if you had not cut it off. This is about all the pruning that is needed, if done at the proper time, and they will look like you had put a coat of varnish on them.

DIGGING.

There are but few dug at one-year-old, which should always be dug with a spade. When two-year-old trees are to be dug for early fall orders, you must first strip off all the leaves, but later in the fall after the leaves have been well frozen you could leave them on, but I would prefer having them off. The tree plow is the proper tool to dig them with if you are going to clean the ground. But if only part of the trees are ready to dig, you will find it best to use the spade, otherwise those that are left to run over until spring or a third season will not do so well.

HANDLING.

Handle them carefully after digging. Haul them to the packing ground, heel in well and do not let them be exposed to the sun. Dry or cold wind is also bad on the young roots, and when ready to ship to the customer, pack well so that the roots will not dry.

GROWING, HANDLING AND PRUNING APPLE TREES.

E. L. Mason, Trenton, Mo.

The proper age of the apple tree for planting in the orchard, is a question that has been thoroughly discussed by members of this society at previous meetings, so I can not hope to add anything of special

interest on this subject. Perhaps it is safe to say that the men who have had the most experience in growing orchards, would favor a strong, well-rooted, two-year-old tree, for the reason that they are more easily planted, more easily pruned into the desired shape, and seem to have more vitality, consequently grow more readily, and more of them live. Besides they seem to come into bearing as soon as older trees planted at the same time. In other words, the two-year-old tree receives far less shock when removed from the nursery row, because the roots have not reached out so far, and are mostly removed with the tree, thereby giving a larger per cent of root than older trees would have unless special pain is taken in digging the older trees. Three, and even four-year-old trees, with a fine root system, when moved only a short distance, by wagon, give very good results. I would add, however, that great care should be used about exposure of the roots. Every root and fiber ought to be just as fresh and full of life when planted in the orchard as it was in the nursery row.

PRUNING.

When we prune the young trees for planting in the orchard, several important things must be taken into consideration. The top must balance nicely with the root system. We must determine the height of head best suited to the trees of different forms of growth, and the best form to give the top to make it strong and shapely. Varieties differ widely in their growth, some make a strong upright growth, others grow regular but more spreading, while still another class takes a decided drooping form. It is evident that the same height of head is not suited alike to the different forms of growth. A Clayton apple tree certainly ought to be headed lower than a Ben Davis tree, and a Ben Davis tree should have a lower head than some variety of a more drooping nature. So in heading the young tree, the height of head should be governed by its habit of growth. In forming the top we must take into consideration the requirements of a well formed top. First, we want a tree with a strong center leader, and we will try to give it an advantage of growth over the limbs so that it can continue its upward course for other purposes. Four or five limbs will

be required to carry the load without too great strain. The limbs must come from the trunk on its various sides, at proper distances, with no two of them coming from the trunk directly opposite each other as such a growth tends to weaken the tree, besides there is danger of water collecting in the crotches and freezing, thereby causing a split. By allowing the leader to continue other limbs can be grown which would give a greater surface for fruit bearing, a larger capacity for carrying the load and make the danger of splitting crotches much less. While varieties of irregular habits can not easily be extended beyond a certain leader and lower limbs, kinds of more regular and upright growth can be successfully grown on the two story plan. I have now given a partial description of the foundation for a well-formed top, but to dispose of the difficulties that will be encountered in bringing out the desired result is quite another thing. Young trees are not always provided with a center leader, and do not always have limbs just where you want them, but they should be grown with a center leader and properly branched for limbs. When such trees can not be procured a good substitute is a strong two-year-old tree in the whip form. There may be those who are opposed to pruning but certainly the young tree should have a well formed top. Nature does not always have its own way in the growth of a young tree, for it has many enemies to contend with. Worms and insects often destroy the buds of the young twig and change its course, making the young tree ill shaped, so to get the tree into more shapely proportions we have to resort to pruning. While much has been said about giving the tree a longer life by budding or grafting on whole roots, the well formed top which is of equal importance, has received much less attention. It is evident whether it be a whole root or a piece root, that the tree should have a good root system, but if the top is formed with forks, and has but three or four limbs, it certainly is in a very poor condition to carry a load and resist the fury of the storms that play such havoc with our orchards. Besides when we plant the young tree, its roots are buried out of sight, but the tree with its well formed top will stand in after years as a monument to the skill and careful training of the orchardist.

PREPARATION, LAYING OUT, DISTANCE, PLANTING AND VARIETIES OF APPLES.

By J. P. Canaday, Bogard, Mo.

Why, in arranging the program, our worthy secretary should assign to me this subject, I do not know, for there are many members here much better qualified to write upon this subject. However if I am able to present a few ideas and bring out a discussion, it may be more profitable than to have only the ideas and plans of one man.

The method of preparing land for planting should vary according to the condition of the land to begin with, but whatever the condition of the land to begin with may be, never plant an orchard until your ground is carefully prepared. Many people will take great pains to prepare a field in which they intend to sow wheat or for the planting of corn or potatoes, then go and plant their orchard in a tough timothy sod or in fresh cleared, unbroken land, then wonder why it is that they can not succeed in growing an orchard like some of their neighbors.

A field intended to be planted to wheat is often plowed a month or two in advance, then plowed again just before seeding time, and thoroughly worked down with harrow and roller; this forms an ideal seed bed in which the seed readily takes root, even in a season of severe drouth. De we ever see land prepared in this way for the planting of apple trees? No, not often. The reason is that the majority of the people have less experience in the matter of tree planting and have not learned the necessity of careful preparation of the soil.

Much of the loss incurred in planting trees is owing to the fact that the land has been poorly prepared, or as is sometimes the case, no preparation at all. Often nothing is done toward preparing the land until the trees are on the ground ready to plant. Then the land is poorly prepared and left with numerous air spaces which cause the ground to dry out rapidly, leaving the trees to perish. Especially is this the case when an attempt is made to plant an orchard on sod land. the same spring that it is plowed. The sod should be plowed under in the spring and planted to corn or potatoes, which will leave the soil in fine condition for planting of the orchard in the fall or the next spring.

•

This applies to timothy, bluegrass, or any tough sod. Clover does not form a tough sod and may be readily put in fine condition for the planting of trees.

In short, I would say for spring planting, give your ground an ideal preparation as for corn. For fall planting, prepare as for wheat. Such land is in good condition to plant to apple trees.

Some say land should be subsoiled. In some soils it may perhaps be necessary, but in our Carroll county soil a good, deep ploughing with a common turning plow is all that is necessary.

When you have your land prepared as above mentioned the next thing to do is to lay it out for planting.

There are almost as many different ways to do this as there are men planting orchards, and I have never used exactly the same plan twice. For planting small orchard of say 50 to 100 trees, it matters but little what plan is used, the entire plat may be staked off with small stakes and use the board with slot in center and hole in each end; it may be planted by the use of a common check row wire, or with one row of stakes around outside, the trees may be sighted and put in line.

But for commercial orchards it is necessary that we use the best, the cheapest and the quickest plan. After using several different plans here is one that I consider the best:

Take a double moldboard plow, or in other words, a corn lister with the drilling attachment off, hitch two horses to this plow and run straight furrows across your field the distance apart you want your trees. When you have this done, turn and lay off the other way driving crosswise of the furrows already made. You now have the land laid off and the holes almost dug. The next thing in order to distribute the trees over the field. I have the trees tied ten in a bundle. Take the trees to the field and drive the wagon between the first and second furrows, heel in two bunches in the first cross furrow and in every tenth cross furrow, then drive between the third and fourth furrows and do likewise, and so on until you have distributed all the trees. This I consider the most convenient and best plan of distribution, as you never have more than ten trees out of the ground at one time during the process of planting, and when one bunch is used another is right at your hand. This plan of distribution is intended for six men to follow and

plant, but any number may be used. For the most convenience have the men work three in a crew. One man goes ahead and prepares a place for the tree by cleaning out the furrows where they intersect. If the laying off has been properly done this will be deep enough, but if necessary dig a little deeper. The other two follow with the trees, one will prepare the tree for planting by pruning off all bruised and broken roots, and shortening in any that may have been left too long. I prefer the roots not longer than six or eight inches.

When the trees are ready to plant one of the men holds it in position and packs the dirt about the roots while the other shovels in the loose dirt. When the planting is finished the tree should be about an inch deeper than it stood in the nursery; this is deep enough.

Some planters advocate leaning the trees toward the southwest. I tried this once but it does not suit me; the result was a number of rain-bow bodied trees; they not only straightened up, but passed on over to the northeast. This, of course, was caused by the southwest wind which the leaning is intended to counteract. I find that the trees hold their position better by leaving them stand straight.

When you have the trees all planted in this manner take a common turning plow and throw one furrow from each side toward the row of trees; the after cultivation will fill up these furrows and leave your field as level as though no furrows had been plowed. The distance apart to plant trees should vary according to the nature of the soil, the varieties to be planted and the intention of the planter.

I consider thirty feet apart oftener right than wrong. Some few varieties may be planted closer with good results, while some of the wide spreading varieties may need more room.

In the near future I intend to plant ten acres of apple orchard. I will plant them 15 or 16 feet apart each way. This orchard will all be Missouri Pippin. I could not recommend this plan to others, as this is only an experiment with me. The Missouri Pippin is rather an upright grower, and bears heavy crops while young, and I am of the opinion that such an orchard will make more money the first 15 or 16 years than the same amount of ground planted in any other way, as we

get about four times as many trees as when planted 30 to 32 feet apart. When they begin to crowd I am quite sure that I will have the nerve to cut out one half or three fourths as may be required. But I expect this orchard to have paid handsome profits before this is necessary, as the young trees of this variety are the ones that bear the best specimens.

As to the age a tree should be when planted, opinions differ and probably always will. A majority favor using two-year-old trees, yet many commercial orchardists are using one-year-old trees, while many who plant in a small way use them three, four and even five years old. It is hardly necessary to say that these are too old for the best results.

The main difference of opinion is between the one and the two-year-old trees. As for myself I prefer the two-year-olds; one-year-olds with us are usually too small; during the first summer's growth the wind sways them about too much, and many of them make crooked trees, while two-year-olds are more stocky and able to hold their own. In planting two-year-old trees, if they are fresh dug and in good condition, I never cut them back, provided the tops have been properly formed in the nursery.

I would prefer cutting all of the limbs off and forming a new top rather than cutting one-half or three-fourths off of each limb as some planters do.

Which is the best season for planting, fall or spring? is another question upon which there is a great difference of opinion. I believe that difference is mainly caused by difference in locality, yet you will find men in exactly the same locality, one of whom would not plant a tree in the fall, while the other would not plant in the spring. With us either season is all right, provided the condition of the soil will permit the work being done at the proper time. It is frequently the case that the ground is too wet in the spring to properly plant trees until after they have started to grow; for this reason I prefer fall planting. If the trees are planted in the fall they should have a mound of earth about four inches high drawn up around each tree; this protects the tree from freezing and holds it in position and keeps water from settling around it.

As to the varieties to plant, this depends greatly upon the locality and the intention of the planter. An orchard planted for home use

should be of many varieties. My selection for such an orchard would be, Yellow Transparent, Early Harvest, Red June, Early Strawberry, Rambo, Snow, Maiden Blush, Northern Spy, Rome Beauty, Roman Stem, Smith's Cider, Jonathan, Huntsman, Winesap, Missouri Pippin, Grimes Golden, Minkler, York Imperial, Gano and Ben Davis. The number of each variety can be governed according to the needs of the planter. These varieties are mostly old, well tested and in general use. The selection of the varieties for a commercial orchard is quite a different thing; if you make a mistake here it would perhaps prove more fatal than in any other part of the business.

There are two essential qualities that your varieties must have to be profitable. They must be good bearers and saleable. To be saleable they must be of good size and have good keeping qualities.

As for my own experience with varieties it is limited. I have always been afraid to plant much of anything except Ben Davis for fear I would make a mistake, and as yet can't see that I have gone far wrong. Although there are some other varieties that I would plant to-day were I planting an orchard, yet I am not sure that they would be more profitable than the old reliable.

Ben Davis, Gano, Missouri Pippin and York Imperial I think would be my list for a commercial orchard. Jonathan is a fine apple and for people in the northern part of the state it may be profitable, but with us in Carroll county it is too early; it won't make money for me. The Winesap has been planted some, but I have never seen a profitable orchard of them. There are many other varieties that I see recommended but have had no experience with them, so I will let those that have, recommend them. The Ben Davis has been and is to-day a money maker.

The Missouri Pippin is a young bearer and has on that account proven very profitable. I would only use it for close planting as mentioned heretofore in this paper, for the old trees are not profitable anyway, so crowd them up, make it bear itself to death and get it out of the way.

The York Imperial has so many friends and I see it recommended so much that I would surely have to try a few of them. I believe it is here to stay.

PREPARATION OF LAND, LAYING OUT, PLANTING AND VARIETIES.

By J. H. Karnes, St. Joseph, Mo.; Oakdale Fruit Farm.

Mr. President:

There seems to be so much work laid out for me in the above subjects that it will be almost impossible for me to do justice to them in a paper that must necessarily be brief.

"The last shall be first," saith the Scriptures. Therefore I will reverse the positions of the parts of my subject and try, first, to discover what varieties to plant (that evidently being the most important part of fruit growing at present) and then proceed with the operations pertaining to planting.

To plant or not to plant, or rather what shall I plant for profit in a family or commercial orchard, is a question beyond the ken of ordinary intelligence not gifted with prophecy to determine.

A short, retrospective view of apple growing in northwest Missouri will abundantly prove the above assertion and show conclusively that the question, "What varieties shall I plant?" is as far from a satisfactory answer to-day as it was ten or even twenty years ago.

The mistakes our fathers and ancestors made were in planting too many varieties. Thirty or more years ago the maximum number of trees of one variety in a family orchard (there were no commercial orchards in those days) was twelve. More frequently fewer than twelve of one kind were planted. In those times you could find from thirty to fifty varieties of grafted apples; also a number of seedlings in almost every orchard. Every orchard plat was a genuine experiment station; superior in many respects to our government stations of to-day, and as numerous as were the homes in the land of those times.

Trees were indeed planted in virgin soil. Many varieties succeeded well for a time and developed whole crops of fruit that were the very "pink of perfection" in all the essential points—size, color and even quality.

The planter said: "Lo, I have found the desired varieties to plant."

Truly those very mistakes and experiments of former times should have discovered to the present generation the very objects they have been so long seeking.

Surely, after experimenting so largely with so many varieties, the planters of to-day should have no trouble to determine what varieties to plant.

However the "lamp of experience" in apple growing has proven no criterion for the future and each grower must be, emphatically, "the architect of his own fortune." Finding out for himself the varieties best suited to his particular kind of soil or location.

Can we not count easily upon the fingers of one hand the very few varieties that have withstood the changing climatic conditions, the ravages of insect pests and the blighting influences of the prevailing fungus diseases?

This paper must necessarily be too brief to make note of the varieties which succeeded well for a time but are now substantially things of the past.

I will discuss only those varieties that have survived the "wreck of the past" and some newer ones that are claiming the attention of growers more recently. Of the "survivors" of the past the Janeton still has some standing in the commercial orchard in some localities, and a few trees should be planted in every orchard for family use. Grimes Golden Pippin has been a favorite for more than thirty years and is more popular to-day than ever before.

The tree is vigorous and hardy in most localities, an upright grower, bears early and every year, sheds its fruit to some extent, yet not so much as Jonathan. Undoubtedly the best eating apple in its season that ever grew. I would plant liberally of Grimes Golden Pippin.

Maiden Blush is another instance of the "survival of the fittest," and is still profitable to plant to some extent. The trees do better after they get some age on them—say ten or twelve years.

You must bear in mind, however, that light or yellow skinned apples will not stand as low a temperature in cold storage as the red

varieties. If kept too cold the skin turns dark and gives them the appearance of decay. Winesap was formerly a favorite, especially where planted in rich soil and well cared for, but of late years it has been both small and very scabby. I do not recommend planting it.

But no other apple ever introduced on the American continent has sustained its reputation, both as to health of tree and perfection of fruit. like the profitable Ben Davis, but often much abused by some. It is the leading commercial apple almost from ocean to ocean, and from the Gulf almost to the Lakes. It is preeminently the king of the apple family, for all purposes in which an apple may be used. I can give no stronger indorsement than the following clippings from an eastern fruit journal:

“THE BEN DAVIS APPLE.

“The tree is a good one, bears early, annually and prolifically. The apple is beautiful in shape, size and color. It is preeminently a good shipper and long keeper. For culinary purposes it has no superior in the appearance, palatableness or utility of the finished product. Cooked or uncooked it is, in its season, agreeable and healthful. In qualities of solid merit for all purposes to which mankind applies it, except for cider and the hypercritical taste at dessert, it is superior to all other apples. This renders it the favorite in commerce and gives it the world’s verdict.

“A few hundred people have for many years debated its quality as a mere table fruit. Seventy millions of Americans and perhaps all apple using people elsewhere, either not knowing of the discussion or caring nothing about it, buy and use this apple when they can get it.

“The Ben Davis apple, like Grant’s generalship, is often criticised but always triumphant. It is a development that meets a need as nothing else of its kind has done. It has pleased the world’s eye. It has convinced the world’s judgment. It is beautiful, useful and enduring. Its deficiencies can not contend against its merits. It is not to be judged by the palate alone. It suffers in quality only in comparison with a very few other varieties inferior to it in all other respects. Applying to it the test of quality alone a comparatively few

men—experts of overtrained taste—have pronounced against it. But it sells for the highest price in the spring. The world's judgment is against them. But, they say, this is when all other apples have perished. This statement, true only to the extent that this apple outlasts all others, brings into prominence one of its chief merits—namely, its fitness to survive its rivals. Anything that entirely succeeds is unsailable by fact or logic."

"Why so much opposition to the Ben Davis? It seems silly continually to talk against our own interests. Europeans like the Ben Davis apples; they want them, and they pay for them. Why not let them have them and hold our peace? The tree is hardy and an early and abundant bearer; the apples are in demand at a good price, and they reach their destination in good condition. If Europeans want them, let us furnish them and consider ourselves fortunate that we have a good market for something so easily produced. The claim that the Ben Davis is not hardy is without foundation, for it stands the climate of Maine equal to a native, and in a few years, will be the leading market apple in the state, if it is not already. Anything that finds a ready market at a good price can hardly be called worthless."

Of course I would plant Ben Davis, but with it I would plant a liberal per cent of Gano to give to the fruit the appearance of higher coloring. The habits of Gano, tree and fruit, are identical with Ben Davis. Some say it is not quite so prolific as Ben Davis. We must also plant some Jonathan, for in it we get both color and quality par excellence. But when we are looking for barrels the Jonathan generally disappoints us.

York Imperial has recently been given a good indorsement over a wide territory in Bulletin No. 8, U. S. Department of Agriculture, and more recently by Mr. S. H. Linton from northwest Missouri, as being an ideal apple for many localities. But no other apple seems so tender or was seriously injured in northwest Missouri by the rigors of last winter as York Imperial. In one orchard of 100 York Imperial, set ten years, 91 trees were entirely killed. I can give other examples

equally as discouraging. York Imperial also blights badly in many places. I would not plant it in northwest Missouri.

Mammoth Black Twig seems to be a vigorous growing tree. But from all reports that I have from it, it comes into bearing late and is lacking in productiveness.

We have not tested Ingram in northwest Missouri, but it is well indorsed and recommended by the best growers in the central and southern parts of the state.

Many other varieties are claiming superior qualities over our old ones, but they have not been sufficiently tested to determine merits. I would advise planters to use discretion and not allow their valor to lead them too far in planting new varieties.

For summer varieties none have given more satisfaction to me than Duchess of Oldenburg and Wealthy. Both are excellent cooking apples and when well matured and mellow are fine for eating. The trees are vigorous and healthy, and bear early and often.

To recapitulate I would plant in a commercial orchard in northwest Missouri as follows: Summer varieties, Duchess of Oldenburg, ad Wealthy and some Maiden Blush; Late Fall or Early Winter, Jonathan, Grimes Golden Pippin; Winter, Ben Davis, Gano and try some Ingram.

Since we have determined what varieties to plant, we will proceed with the preparation of the land and laying out and planting. I believe in planting trees on good soil if you have it. If not, make it good by fertilizing. I also prefer to plant in the spring, but if practicable prepare your ground in the fall by plowing as deep as possible. I would not break again in the spring, but pulverize well with a harrow. If ground is free from obstructions—stumps and stones—planting can be greatly facilitated by using a large lister plow to open up the rows going north and south with lister, making rows 32 feet apart from east to west. Then take some small plow and cross your lister furrows, making the distance from south to north 20 feet. This allows 68 trees per acre.

You have your trees, place some wet straw in the bottom of wagon bed, shorten the roots of your trees (leave the tops alone), also "puddle"

roots well, place them in the wagon and throw a wet carpet or blanket over the trees so as to exclude the wind and sun. "Firm" the dirt well about the roots, and when done planting take a common breaking plow and throw one furrow to the tree from each side, making the furrows lap well, but not too high on the body of trees. You may prune the tops the second year. Head low, "dress and keep" and you may reasonably expect, in due time, fruit time and harvest.

SETTING AND CARE OF TREES.

By G. E. Adams, Darlington, Mo.

The spring being backward I did not have time to break my ground, so prepared for receiving my trees by staking off for each row both ways enough to use the plow for a marker. When the trees came I cared for them as instructed by the nursery, then I began on my ground by going once with the field plow crossways to indicate the place for the trees, then I began the other way and listed out for the row by going three or four times for each row, putting the plow deeper every time. This will be deep enough for one-year-old trees; if two-year-olds may have to dig a little deeper to receive the roots. When I got a row listed I planted the trees before the dirt got dry by simply taking a bunch of trees, and at each cross I placed a tree and drew the dirt around it with my hands. After setting several rows I take a spade and finish filling around my trees, tramping firmly, making a slight mound around the trees. After the trees are thus set I take my plow and fill up the ditch which makes a good drain for excess water and also holds the moisture better by being broken up.

My trees were one-year-olds and my trimming was done by cutting off all limbs and topping them back. The season being dry and cutting the growth of the trees short, I rubbed and trimmed most all of the buds off again. I have a fair to good growth upon all my trees and only lost one in 336. I set the apple trees 28 feet apart and put peach trees between the trees in the rows, trimming same as the apple trees, but not in the summer. I have a fine growth upon the peaches and the

loss was only eight out of 225. My plan is to crop the ground lightly with corn two years and then give the ground entirely to trees, cultivate the row and sow the center space to clover.

As this is my first orchard setting I can not say what the future will be but I am going to follow along the line laid out by the State Horticultural Society's workers.

DISCUSSION ON ORCHARDS.

J. J. Kiser.—I have a suggestion to offer in regard to distributing trees for planting. I puddle and pack in damp straw or hay, right in a wagon, drive along the rows as we plant and take out only one tree at a time, plant in the fresh soil while it is still dripping wet. I would not lean trees to the southwest, for if this is done strong limbs are apt to grow on the northeast side of the tree and pull it over in that direction. Straight up is best. I take two-year trees which were cut back at one year, thus making a strong growth of thrifty young wood. I favor spring planting, but would dig the trees in the fall, heel in root and branch and in the spring they are ready to grow right along. I have two little maps here to show how I would make the rows. On a hillside I would run the rows right around the hill. Keep rows as level as possible so that the soil would not wash when cultivated. I think on level ground that hexagonal planting has advantages over square planting, as it gives sixteen per cent more trees at the same distance. For temporary trees to be removed when they begin to crowd I would use Missouri Pippin.

L. H. Callaway, of Illinois.—Have you any difficulty about leaf curl on Missouri Pippin? Some Illinois growers have discarded it for that reason.

Prof. J. C. Whitten.—I have not seen any fungus which causes leaf curl on this or other varieties of apple.

R. E. Bailey, Callaway Co.—It is the aphid. The Missouri Pippin seems more subject to this insect than other varieties in my orchard.

E. J. Baxter.—Is the York Imperial hardy in our ordinary winters?

J. E. May, Adair Co.—York Imperial stood as well as any.

M. Butterfield, Jackson Co.—I think York Imperial as hardy as any.

A. H. Gilkeson, Johnson Co.—Do not the trees in the Bayles orchard in Jackson county show great damage from last winter's cold? In passing by the trees seem sickly.

Mr. Butterfield.—That is no proof of the weakness of the York Imperial. There are only 250 trees of that variety in the orchard and they do not show from the road.

N. F. Murray.—Our customers complain of the blight on York Imperial, and some of them are digging them up and throwing them away on that account.

J. H. Karnes, Buchanan Co.—I had only a dozen trees of the York. Nine of these were entirely destroyed and the others hurt by the past winter. One of my neighbors had 50 trees of York. Over 40 of these were killed. Another friend, out of one hundred trees set nine years, lost 91. In one other locality I know of the York being badly damaged. In the vicinity of St. Joseph York blights worse than any variety except Jonathan and Yellow Transparent. The latter blights almost as bad as the pear.

H. M. Hulen, Boone Co.—I have five hundred York Imperial and am not losing any. They don't blight half as bad as Missouri Pippin.

J. T. Snodgrass, Howell Co.—After a winter of thirty degrees below zero we had a fine crop of York Imperial, and no blight.

E. J. Baxter.—How would the Ingram do for a filler in a Ben Davis orchard?

L. A. Goodman.—It would live longer than the Ben Davis. It does not bear as young as the Ben Davis, but grows as large, more upright, rather slow grower like the Janeton. Its great value is in its late blooming, after all other apples, except the Janeton. It resembles the Janeton but is more handsome and better colored. It escapes early frosts at blooming time.

C. Hartzell.—In the papers read, allusions were made to the manner of plowing. I take it from observation that plowing the ground is the great thing. There is a very great reason why we should plow the ground before we plant the trees. It can not be well done afterwards.

J. C. Evans.—There seems to be some question of the hardiness of the York Imperial. I think it depends very much upon where it stood and how it was affected by the drouth of 1897.

N. F. Murray.—The Missouri Pippin blights badly in north Missouri.

Member.—How would the peach do for a filler among apples?

E. J. Baxter.—It is bad policy to plant peach trees among apple trees.

J. C. Evans.—I do not think any practical man ever tries that a second time.

Mr. Gilkeson.—Our Grimes trees could not stand last winter. In 1884 I lost many Grimes.

K. B. Wilkerson, Audrain Co.—We have one orchard of 65 acres, trees planted from three to five years. Ninety per cent of the trees safely passed the winter. Of the York in this orchard 68 per cent survived. Of the Gano only 20 per cent. Another orchard of fifty acres of several varieties went through all right. I think the difference is caused by location, cultivation and whether the trees grow early or late. Where we plowed deep before planting the trees have done better. One orchard of sixty-five acres was cultivated too late. The trees grew the third time and suffered badly. When is the proper time to quit cultivating? If a drouth comes on you must work late. I think location, season and condition of the orchard should be taken into account in deciding how soon to stop cultivation.

G. T. Tippin, Greene Co.—The hardiness of orchards depends especially upon their condition. I do not think you will find the York more tender than anything else.

Some things read and said seem to make the impression that you can grow an orchard on any kind of land. This is a mistake. Good and profitable orchards can be grown only on good and suitable land. Do not plant over hard pan. Do not plant much on gravelly soils. Plant only on your heaviest, richest soils. As to varieties, in south Missouri Ben Davis is king, with York and Ingram for next choice. Ingram is one of the best trees, hardy and long lived. I take it that in the nursery we have a pretty good place to make an estimate of the

comparative hardiness of varieties, for all are treated alike. In our grounds the York stood as well as any tree we have. I do not think the York is a tender tree. As to the ages to plant, in the southern part of the state we rather favor one year trees. I emphasize the statement about pruning the roots of young trees when planting them in the orchard. Nursery men should prune the roots heavily. We usually get two-year trees with roots twelve to fifteen inches long. Cut them back to six or eight inches. When you plant trees with long roots they will start only small fibrous roots and will not send new and strong roots down deep into the soil, like it would do if you cut off the roots. This is not a theory but was learned by experience. Trees, to do well, must have roots deep into the soil.

H. R. Wayman, Mercer Co.—The Grimes has been successful here for thirty years.

Maj. Holsinger.—I planted York Imperial twenty-nine years ago and at various times since. The trees are the best I have to-day. It originated in Pennsylvania, near where I originated. I felt like in planting it there would be at least two good things in this western country. In '73 the thermometer went as low as last winter. Two-year Yorks pulled through. Other kinds perished.

I am glad to see Mr. Tippin and others coming around to my position in regard to the roots of trees. I don't care whether a tree has any roots. If it has roots I cut them to one inch instead of six or eight. When you cut the top you cut the lungs of the tree and it has nothing to live on. Another good point in the paper is plant your best lands. Poor land will not do.

K. B. Wilkerson.—I am interested in the York and am glad to hear that it is generally doing well.

Every year I am cutting the roots of my trees a little closer. A few years ago I got some Black Twig apple trees from Kansas. Their roots were so poor that I threw away many of them, but for the lack of something better I planted twenty-five or thirty of them. The first year they grew fairly well, and the second year they shot away up, some growing four feet or more. We had Red Astrachan killed in nursery while York suffered but little. This part of the nursery had two hundred loads of manure to the acre.

N. O. Booth, of the Experiment Station at Columbia, gave briefly the result of their experiments in planting trees with roots of different lengths, showing that extremely long or short roots were not as good as medium.

Question:—How late would you cultivate a nursery?

N. F. Murray.—We cultivated till the last of August and lost 75,000 two-year apple trees and 80,000 one-year-olds by the extreme cold of last winter. These were on a north slope. On south slope they came through all right.

L. A. Goodman.—I am fully satisfied that the hardiness of trees depends more upon the subsoil than upon the soil and cultivation together. Cutting all the roots off, as recommended by some, will not do in this country.

CULTIVATION, CROPS, TOOLS, AND PRUNING.

By H. W. Jenkins, Boonville, Mo.

The orchard has been planted and well planted. The question that now presents itself to the owner is, "What shall I now do with it?" Leave it alone to the tender mercies of a pitiless climate and to the merciless rabbit and borer and let these trees which are things of life eke out a miserable existence for a short time, believing in the "survival of the fittest!" (and the fittest won't bother you long under such treatment) and then give the nurseryman a blessing for selling trees that did not have a "tap root" and a Canadian-oak-iron-clad constitution! Or shall I take care of them the same or better than any other crop I plant by good cultivation?

I answer there is but one alternative, either cultivate and do it well or else waste all your time and money previously expended in the planting. There is no half-way business about it. To meet with success you must cultivate often—at least every ten days (condition of soil permitting) from May to September. Cultivate shallow and deep, keep the ground level, never allow the soil to bake and become hard around the newly planted tree. By the way, many Missouri farmers injure their

corn crop by cultivating too deep and at the last cultivation make sweet potato ridges out of the corn row, instead of leaving it level so it will retain the moisture and stand drouth.

The motto of every tree planter and corn grower should be, cultivate shallow, level and often.

Cultivate crops in orchards the first three years. I consider corn and potatoes or any crop requiring cultivation the best to plant. Never sow any small grain unless you leave a strip next the tree row that can be cultivated by plowing or hoeing.

BEST TOOLS.

In this day and age of improved machinery every orchardist should provide himself with good tools to work with. So far as the writer's knowledge extends the Planet Jr. horse cultivator with its various shaped shovels is the best cultivator for general cultivation among young trees. Be sure to get a set of wing shovels or sweeps for use in shallow, level cultivation; also provide a short single tree, sixteen inches is about the right length. Another good tool is a good bright, sharp hoe. Sharpened from the inside the same as an adz or mattock.

"The man with the hoe" is all right among newly planted trees if he uses it. A sharp, fine-tooth saw and a good hawk-bill knife are also necessities.

PRUNING FIRST, SECOND AND THIRD YEARS.

This part of growing an orchard is an important one, especially the first year, as that is the time to correctly shape the future tree. The old saying is true: "As the twig is bent the tree is inclined." After the tree has been planted shorten in the branches at least one half, leaving the central shoot much the longest. Cut off side branches till top is evenly balanced, if top is formed all on one side cut back to a whip and let new top form. If head is wanted at 20, 24 or 30 inches keep all sprouts rubbed off below. Prune the second year with the view of shaping the future tree. The third year prune only such limbs as cross each other, or that grow irregular so as to spoil the symmetry of the tree. Beyond this the writer does not believe in much pruning. Re-

member the more you prune unnecessarily the more you will have to prune.

CULTIVATION, CROPS, TOOLS AND PRUNING.

By Arthur Patterson, Kirksville, Mo.

In the cultivation of a commercial orchard for the first three years we have the most essential work in producing the trees which will bear the crops of apples later on. It is almost absolutely necessary that we cultivate during this time in order to produce a thrifty growth of wood and to give the trees a good start. The reason why we should cultivate at this time is for the same reason we cultivate any other field or garden crop. Years ago it was thought that keeping down weeds constituted the whole of cultivation; such is not the case now; cultivation now means conserving moisture, liberating plant food and keeping down weeds. The easiest manner of conserving moisture is in cultivating by breaking up into as fine particles as possible, which is best done by a small and many-toothed harrow of any size or shape, one or two horses, any old thing—just so it does this work. This is not accomplished by a few workings of the soil but by many.

While I have never used the plan, I suppose the best possible way of cultivating a young orchard for the good of the trees is to cultivate it without any growing crop between, but I have always used corn which I think has its advantages also, by shading the trees more or less during the hot, dry months of August and September, while abstracting perhaps not very much nutriment from the trees.

Now, the distance the trees are planted apart has something to do with the cultivation of a young orchard. I say plant them either 16 or 30 feet square. Each has its advantages. The closer planted, in that the same amount of labor expended for cultivation, answers for four times the number of trees as there are four times the number of trees to the acre. True such an orchard does not last long, but it is the fruit from the young trees that the buyers want, as it is generally larger

nicer, and will keep longer and sell better. By planting the trees 30 feet apart the crops grown between the trees can be cultivated better and will produce better, thereby lessening the expense of growing the orchard, which is considerable for a commercial orchard of any size. Planted in this way, the land occupied by the trees will hardly be missed from the farm. The trees will also last longer.

As to tools we have used in the cultivation of a young orchard a breaking plow, a good adjustable iron-tooth harrow, an 8 shovel, two-horse cultivator and a Planet Jr. five-tooth, one-horse cultivator is enough for anybody; using the one-horse cultivator for the tree rows. Another important item is to plant the corn so it can be cultivated both ways, thereby lessening the amount of hand labor in hoeing, etc. I have always thought that trees planted in squares were more easily cultivated than those planted in diamond shaped spaces.

Now as to the pruning. I have always pruned heavily on planting, then the head should be formed by allowing only the best limbs to remain and only those that are growing exactly where you want the head to form. This is best done, that is to require the least labor and to give the least shock to the tree, while the wood is yet soft and no more than a sprout. I think the heads should be formed not more than $2\frac{1}{2}$ to 3 feet from the ground. We must always remember that there is such a thing as over-pruning which gives a shock to the tree and stunts its growth and also that there is such a thing as under-pruning which will in later years give the tree a bushy appearance, allowing no sunlight into the interior and hardly any circulation of air through it. The safest plan is to strike the happy medium and prune just enough which will also induce fruiting to a certain extent.

With all this hue and cry of selection of varieties, of planting, cultivating, pruning, spraying and the endless amount of labor required for years to grow and produce an apple orchard, and with all the good literature and papers written by able men who are experienced orchardists, it is one thing to read all this and to listen to all this, but it is quite another to select the proper soil which has the natural fertility, to select the location which has the proper frost and water drainage, to

select the proper varieties which the buyers will want ten years from now, to give the proper attention in the way of pruning, cultivating, spraying, etc., and to produce an orchard that will be pleasing to the eye, give intense satisfaction to the owner for all the labor and money he has expended on it and that will pay his mortgages and swell his bank account.

GATHERING AND MARKETING OF THE APPLE CROP.

By A. Nelson, Lebanon, Mo.

The year now closing will prove, on the whole, to be a most disastrous year to the general fruit interests of the country. The first main cause was the under estimate of the fruit crop for 1899. The buyers, or many of them, started out with the idea there were no apples, which was in part true so far as our state was concerned. I believe the estimate I put on the crop in our part of the state was over instead of under. I never put it at over 30 per cent of a full crop and now the crop is marketed it turns out less than 25 per cent of a crop, and about 90 per cent of what was packed should have gone to evaporators, canning factories and the cider mill. Results have already shown to this society that this is only too true. What can we as a society do to correct this evil, and an evil which if encouraged will bring disastrous results to the great fruit interests of Missouri? Let us look back for a moment upon the results of this kind of packing to our friends, the strawberry growers. Many of those hard working men thought the market would take anything in the shape of berries, and no doubt some went as far as some of our apple growers and pulled up vines and all and filled the boxes as the apple men put in culls and No. 2 stock which they thought were plenty good. We all know the disastrous result from such packing, and what is true of our berry friends is more than true with the apple growers; any apple as large as a persimmon must go in a barrel and at full price. With the facts as above stated; much of the fruit that has been packed to glut our markets and break down the prices of fair to good fruit, should have been consumed on the

farm as stock feed or worked up as first stated. Anyone that has noticed the condition of the market in St. Louis could easily see that thousands of dollars each day were being lost by some one; the average cost price of apples from along our line (and we pack at fourteen different points) laid down in St. Louis cost from \$1.80 to \$2.25 per barrel. We all know now and we knew it then that somebody was being hurt and hurt bad. It is a well known fact that thousands upon thousands of barrels of apples were sold on St. Louis market at 75 cents and up to, in some cases, fancy prices. But where is the remedy and what will our society say and do to prevent a repetition and forestall such disastrous results? Some may say I sold my fruit for good prices and I worked off culls and No. 2's. Yes, that is true in many cases and no doubt these men would have felt good for the time being if they had filled the barrels with small limbs and roots from the trees as long as they could get them. The strawberry men are taking the correct course to avoid a repetition of what happened to their trade last spring, and it is not too much to hope that from the experience of the apple year now drawing to a close and out of the disaster that has overtaken so many, ways and means may be devised to correct the abuses that have crept into the trade. I speak from the standpoint of a grower as well as a buyer, packer and shipper; I have had forty years or more experience in the apple trade and never but once have I experienced such a year as the one now closing. But there is one fact that must not be lost sight of, when buyers go in the market bucking against a supposed short crop nine times out of ten it will go against them. But I will leave this subject to the consideration of the society, hoping something may grow out of these crude and hastily prepared suggestions.

Friends and fellow workers:

I regret much my inability to meet with you, as this should be one of the most profitable and interesting meetings ever held by our society. First the Paris, France, exposition next year, while our exhibit will not be a large one, yet I have every reason to believe it will be a fine one while it lasts; after this comes the Pan-American exposition at Buffalo, New York, in 1901, and it is not too early to commence preparing for it. At that exposition, as the boys say, we will have a hot

contest as we will be brought face to face with the best orchard products of the country. New York state is almost without a rival, while Michigan, Canada, Pennsylvania and the New England states will all be arrayed against us to pluck the laurels we have so often won at such contests. The question is will the fruit interests of Missouri be held to the front in this contest as she has done in the past? I for one say "Yes," we will win at the Pan-American exposition or pull up by the roots our Ben Davis apple trees.

I refer you one and all to the letter in the hands of Mr. Goodman, to show you I am in earnest. While York state is the land of my birth I will do all in my power to join hands with you in winning from her at that contest. This matter needs our earnest thought and attention at this meeting and I hope for one that action will be taken and committees appointed at this meeting to bring this matter before our people, not only the fruit growers, but the governor of the state and our law makers. It costs money to make such exhibits and it should not be left to a few to do all the work and then foot the bills. These are matters of state pride and the entire state should aid us and not a few individuals in a matter of such great importance to not only the fruit men, but to all the interests of the state that tends to put Missouri to the front where she is entitled to be placed. In closing this hastily and poorly prepared paper I want to reiterate and impress this one fact upon the fruit growers, no matter whether it be strawberries, peaches, or apples, there is always a demand, and I believe ever will be, for choice fruits of all kinds and at paying prices, and no one year has more fully demonstrated this than the year 1899, now drawing to a close.

Yours truly,

A. NELSON.

DISCUSSION ON ORCHARDS.

L. A. Goodman.—First cultivation and then pruning should be thoroughly discussed.

N. F. Murray.—Cultivation seems to have had more to do with the killing of our trees than anything else. We cultivated till the last of August. The trees kept growing till late and were killed by the extreme cold.

Maj. Holsinger.—At one time I believed in thorough cultivation, but now I don't know whether it is best. Judge Wellhouse, the apple king of Kansas, has stopped cultivating, though I still believe that on the whole it is better to cultivate thoroughly and vigorously. I have

two German neighbors who have grown more apples than any two men I know. They do not cultivate. Last fall they had a magnificent crop of fine fruit. One of them said he had eight successive crops without cultivation. They had clover in their orchards, mowed it and left it under the trees. I live only three fourths of a mile away from them; yet when we left one orchard without cultivation the result was disastrous. "You pay your money, you take your choice." I don't know anything about it, and I don't know anybody who does.

J. F. Wilcox, of Buchanan county recommended little cultivation, use disc harrow for cultivation, sow in clover, cultivate every second spring. He keeps his orchard in good condition in this way.

Mr. Callaway, of Illinois.—I would like to know what you people think of sowing oats late in the season, about the last of August.

Mr. Gilkeson.—I have no experience. Kellogg, of Michigan, recommends it for a covering during winter.

J. J. Kiser.—I sowed oats this fall. I believe the theory is right.

N. F. Murray.—I believe in it as theory, and regret that we don't sow them. Mr. Bagby sowed one half of a block of 800,000 peach buds in oats in August. In the oats the buds were badly killed. Where there were no oats they were all right.

L. A. Goodman.—I think rye is the best thing you can put in the orchard. The next spring you have a nice coat to turn under. It is one of the best things to protect the orchard during the winter. So far my experience is very favorable. We sow sometimes as late as November. It made quite a nice growth even so late. You can turn it under or cut it very early and let it lay. Plowing in October seemed to do no harm; the trees did not start a new growth.

INJURY BY DROUTH.—CAN WE HELP THE TREES?

By J. E. May, Wilson.

Mr. President, Ladies and Gentlemen:

When our worthy secretary wrote me he had assigned me the above subject and requested me to prepare a paper for this meeting, my first thought was to write him that I could not, for be it known I

am a far better hand with the hoe and cultivator than the pen. But upon further thought I concluded to try, for I always desire to do my part. Friends, if I fail to show that trees are injured by drouth I beg you not to criticise too harshly but to remember I have only had five years' experience in orcharding, except to set out a few trees occasionally and then generally leaving them to take care of themselves, as far too many are doing. I have learned many valuable lessons in my orchard and by observation in the past five years, among them being the one that trees are often injured by drouth, but in almost every case it was by the owners neglecting them. I don't suppose there is a person within the sound of my voice but what will agree with me that a great many trees are injured by drouth, and if I may say something to make the carelees open their eyes to their own interests and encourage them to take better care of their young and old orchards, then I shall feel that this paper has not been an entire failure. Many times we see fine young trees set out in the spring (and far too often set in the fall, which should never be done in northeast Missouri), sometimes in ground well prepared, but oftener not prepared at all; for I have seen trees set in a meadow sod and the man might just as well put his money in the fire and saved the labor of setting them out. One man just a short distance from Adair county set forty acres in just such ground two years ago and of course lost the most of his trees, besides a good deal of labor. A great many times the man that prepares his ground well and vows he will take good care of his trees, forgets all about them when the rush of farm work comes on and don't think of them again until after the crop is gathered, when, perhaps by chance, he remembers he set an orchard in the spring and goes to see how well it has grown, when lo! and behold, a large per cent are dead, and the balance a poor, sickly lot which it will take years of careful nursing to make good trees of. What was the trouble? Injury by drouth, caused by neglect. I will venture to say he declares orcharding a failure and were the man near, that sold him the trees he would not hear anything complimentary of himself.

To my mind the orcharding is not a failure, but the man is, so far as growing an orchard is concerned. You can come just as near growing a crop of corn by planting it and trusting to providence to do the rest

as to plant an orchard and expect fruit from it without giving it proper attention. This is no pen picture, but one that can be verified by a ride of only a few miles through the country. I had occasion to ride some twenty miles through our county (Adair) during the month of October, and, as is my usual custom, took particular notice of orchards along the way and, my word for it, there were very few but what showed great neglect, and had we not had a very wet season, would no doubt show the effects of drouth. Some were young orchards planted a year or two ago, others were five or six years old, and some were old veterans that were fast going to decay and needed to be removed that they might not offer a breeding place for injurious insects and that the owner might use the land for other purposes. Some had planted the ground to corn and given the corn fair cultivation but forgot to cultivate the trees, and you could hardly see them for the weeds; the owner never thought to cut them down so that they might not seed the ground for another crop. Don't you suppose it hurt those trees with that great crop of rag weed, Spanish needle, etc., sapping the very life out of them and taking the nourishment the trees needed? I do, and the foliage showed it very plain and seemed to be asking for better treatment. It is a shame for a man to plant trees and give them such treatment for, be it known, with just treatment they are his best friends. It is strange to me why men will cultivate their other crops and neglect their orchards when the orchard will pay many times the best. One of my neighbors sold nearly \$600 worth of Ben Davis apples from three-fourths of an acre orchard in the past five seasons, this year getting \$135 for the fruit. Can you do as well raising corn or wheat?

Can we help the trees? I answer yes, and the time to begin to help them is before planting by having the ground in the best possible condition. Use care in setting and then cultivate thoroughly so as to send the roots deep into the ground that they may not suffer when drouth comes, which is sooner or later. Cultivation should begin early in the spring and be kept up until about August, when it may cease provided the season is a reasonably wet one, otherwise it will be well to cultivate later. One who has never tried it will be surprised how

long the ground will remain moist where it is cultivated shallow and often. Let us learn to love our trees as our friends which they are, and then we will take better care of them, and in a few years they will pay us many times for all work bestowed upon them. And how much more homelike it makes a home where there is a well-kept orchard. We think if more would attend these meetings and take some good horticultural paper there would not be so many neglected orchards all over north Missouri and they would not show so plainly "injury by drouth."

DRESS AND KEEP THE ORCHARD.

By Conrad Hartzell, St. Joseph, Mo.

Cleansing the orchard implies that there are orchards and that cleansing is necessary—beginning perhaps with the first work preparatory to producing the orchard, then cleansing the land and preparing to plant the trees, belongs to the cleansing which includes first plowing the land—not simply making holes in which to plant trees. Cleansing the orchard fully, means to dress and keep after tree planting. Pruning, is dressing. Preventing insect devastation, is keeping. Both are man's work; both are possible and within man's "possibilities." Yes, cheap labor is recommended to begin with. Domestic animals and poultry; sheep lead in cheap labor, because of the very many benefits derived from keeping sheep in the orchard; and hog labor is also cheap; insect destruction is very necessary and is quite possible. Poultry keeping in the orchard is a great help in cleansing the orchard, but preferable to all other known helps is manual labor properly directed. It may prove cheapest of all in the end—labor by intelligent men in the destruction of insects in the orchard is included in the items of dressing and keeping. When in winter quarters insects are easily and readily destroyed by man. Spraying is so very modest, and although very much like hard work, spraying seems like playing and it makes the winged insects laugh. Weed-growing in the orchard should be entirely prohibited. Sheep kept in the orchard in sufficient number is a sure way of cleaning out all the weeds. Clover is a valuable orchard grass

for cleansing and enriching the land. Old and neglected trees, not too near dead, can be soon brought into bearing and profitable fruiting by cleaning the trees and working around the base of the trees. Moving the earth vigorously and applying salt, lime and wood ashes, remove all the old rough bark from the tree, particularly at the surface of the ground, where may be found piles of insects in their winter quarters and then and there it is easy to destroy them. The insect pest generally in the orchards in the United States is now demanding of the horticulturist most serious and immediate attention as is well known every where. The orchards are overrun with destructive insects. Some very erroneous opinions are extant doing some injury, namely, that the insects in the orchard are a necessity for the good of the orchard, and that no work by man can be done in the orchard that can benefit the orchard, and very much has been said in favor of planting shrubs instead of planting trees, but common sense says different.

Man has been plodding along in the same old way with too little progression—too conservative entirely, except perhaps in travel. Man goeth; yes, he goeth. Just look and think. Examine the locomotive, not yet one hundred years old, see how it goes whizzing by, and some times through the orchard, and think about the most necessary and most useful tool of the orchardist—that tool so necessary that even the locomotive could not exist or be needed but for the plow—the earth mover, so conservative that even now in old Egypt their best plow is a forked stick just like they used 3,000 years ago—too conservative except for orchard work in the United States, in Missouri, A. D., 1899. It is time spraying has been commenced. Very little earnest, progressive earth moving has yet been done, but let us hope in the morning twilight now so near—yes, the morning light of the twentieth century is upon us—that man will take a mighty step forward. Woman will come to man's help as never before. Darkness and ignorance must be relegated to rear seats, especially in orchard, field and garden work. Will great progress be achieved because man will occupy higher grounds in higher callings.

Higher aims, higher motives, higher plans must be employed by progressive horticulturists. Better fruit is the leading object and more

money next. One sure means is in reach by starting right. Starting right is of the greatest necessity. Yes, a right start is the only sure way to success.

"Dress and keep" was the complete list of instructions given to man and will not fail when followed by the orchardist. Man is like a tree—planted by rivers of water—as in Missouri. God planted the first orchard—then called a garden. God put the man in it to dress and keep it.

Cleanse the orchard and make it fruitful. Dress means fix up and make beautiful as well as useful. Keep, is a favorite word full of meaning to-day. Yes, keep the trees healthy and clean; do that which is necessary in the orchard for success. Use thought and action at the proper season and in time. Let nothing prevent, but keep the motto ever in memory—do not forget to dress and keep.

A valuable help in cleansing the orchard is the birds, and man should provide shelter for his feathered friends and by the same provision otherwise protect the orchard, namely, by growing evergreen hedges, say on section lines, for birds to winter in—and in the Ozarks build walls of rock and plant trees for the birds to dwell in safely.

Orchards of trees are much easier kept clean than are orchards of shrubs, and the fruit grown on trees is far superior to that grown on shrubs, and well shaped trees are much longer lived than dwarfy, uncouth shrubs.

The most prolific source of insect production is the prevailing habit of growing culls too near the ground. Nature's laws must be obeyed or dire calamity comes. Good, perfect fruit is desired and is only obtained by properly directing man's efforts and following nature. Salt properly and sufficiently used on orchard land is sure prevention to tree and twig blight. Wood ashes, lime and leaf mold are all very valuable for young trees, not only for cleansing the orchard, but also giving healthy growth and prolific crops of fruit on all trees of bearing age. It should be remembered by all interested in fruit production that clean orchards produce the best fruit. Dressing and keeping clean is a vital matter.

Mr. Murray spoke of a home made cultivator with slanting steel teeth for pulverizing the ground. He finds the disc harrow one of the best tools for orchard cultivation. He used this harrow last spring on ground covered with a heavy growth of cow peas, and succeeded in making the surface a fine dust mulch.

THE MORE COMMON APPLE INSECTS.

By Prof. J. M. Stedman, Agricultural College, Columbia, Mo.

I trust our secretary does not intend for me to tell you about all the insects that are known to injure, in one way or another, the apple, for it would require a whole day to go into details in regard to their habits, life history and methods of suppressing them. I shall, therefore, mention only the more common ones that I know trouble you who live in this locality. But, before giving specific cases, allow me to make a few general remarks for the benefit of all.

As most of us are aware, our common arsenical poisons—Paris green, London purple, etc.—are very apt to be adulterated, and as a result of this we frequently reap no benefits from our spraying, although our part of the work is done properly. This has led many stations to experiment with different substitutes for the above poisons, and as a result the Michigan station has hit upon what appears to be a perfect substitute. I have been experimenting with it during the past season, with the result that I believe it can be used as a perfect substitute for Paris green or London purple, and has the following advantages: It is absolutely pure and contains a known definite amount of arsenic, is not so liable to injure the foliage and remains suspended in the water much better, thus saving the trouble of being so particular in regard to constant stirring while spraying.

Arsenate of Soda.—The new substitute is called arsenate of soda, and will be made by you individually as follows: To two gallons of water add two pounds of powdered white arsenic and eight pounds of sal soda. Boil this until all is dissolved, which will take at least fifteen minutes of boiling—perhaps longer. Add water to make up the two

gallons as soon as it is boiled enough, otherwise when it cools some of the chemicals will crystallize out. Place this concentrated solution in a jug and label "Poison," etc. When you desire to use it, remember that two quarts of this liquid is equal to one pound of Paris green, therefore, take two quarts of the arsenate of soda and add it to the proper amount of water, which will vary according to the insect and plant, and add to all eight pounds of freshly slacked lime, and thoroughly mix.

The life, histories and habits of the different species of insects infesting your apple trees are interesting, and, in many cases, you should know them in order to intelligently apply the remedies; as I have given them before to this society, and as the time is limited, I shall simply name the different species and give you the remedy.

The wooly aphid on the roots can be killed and kept away by the liberal application each spring of tobacco dust about the base of the tree and roots, by first removing the earth for three inches in depth, filling in the tobacco and covering it over with the earth again.

The aphid or plant louse on the leaves may be readily killed by two applications of kerosene emulsion; or, if you have the raw kerosene and water mixing spray pump, which can now be purchased, you can use this less troublesome method with success. Begin spraying as soon as the lice appear and before they curl up the leaves.

The oyster-shell bark louse and the scurfy bark louse can both be killed by two or three thorough sprayings with kerosene emulsion, or the kerosene and water method, as given for plant lice.

The flat and the round-headed apple tree borers can be kept out of an orchard only by the use of all three of the following methods: Keep the wooden wrappers on the young trees, they tend to lessen borer attacks; every year go through the orchard the last of August or fore part of September and by means of a sharp knife dig out all borers; every spring apply a wash of some kind to the trunks and large limbs, removing the wooden wrappers long enough to put this wash on. There are a great many good washes, but for the benefit of those who may desire to know one, I give the following, which I have found to be as good as any wash made and it is very cheap: Dissolve as much

common washing soda as possible in six gallons of water, then add one gallon of ordinary soft soap and one pint of crude carbolic acid and thoroughly dissolve; slack a quantity of lime in four gallons of water so that when it is added to the above, the whole will make a thick whitewash; add this to the above and mix thoroughly, and finally add one-half pound of Paris green or one-fourth pound of powdered white arsenic and mix thoroughly. Apply by means of a whitewash brush.

The leaf crumpler can be picked off a few young trees by hand during the winter, but if they be in large trees and a large orchard it is better to spray with the arsenite soon after the tree begins to leaf out, using one pound of Paris green or two quarts of arsenate of soda in one hundred and fifty gallons of water.

The leaf folder can be killed by the above method also, but should be watched so as to begin spraying just as soon as the larvae hatch and before they curl up the leaves.

The canker worm is easily killed by the above method, and spraying should begin as soon as the larvae appear, otherwise they may defoliate the trees in a few days.

The web-worms and tent caterpillars are better destroyed by means of a torch applied in the late evening when the larvae are all collected in their nest.

The New York weevil and the imbricated snout beetle can be killed, but not successfully by spraying with the arsenite.

The twig pruners, girdlers and borers can not be prevented, but may be lessened by gathering and burning the fallen twigs.

The climbing cut-worms may be prevented from getting up the trees by tying cotton wool about the trunks.

The codling moth can be largely controlled by spraying with the arsenates using one pound of Paris green or two quarts of arsenate of soda (plus lime in all cases) in one hundred and seventy-five gallons of water. The first spray should be applied about one week after the flowers (petals) fall and then every eight days for four sprayings. If it rains at any time during this, repeat the spraying and do not count it.

DISCUSSION OF INSECTS.

N. F. Murray.—Does poultry in the orchard hold down the insects?

Prof. Steadman.—They will tend to keep down the codling moth leaf crumpler and insects of that kind, but not aphids and such sucking insects.

L. A. Goodman.—For two years the leaf crumpler has been very bad in Bates county.

DISEASES OF THE APPLE.

By Prof. J. C. Whitten, Columbia.

Among the diseases of the apple we will mention the scab and the skin blotch. These can be kept down by careful spraying with Bordeaux mixture. We find that four pounds of copper sulphate and four pounds of lime in fifty gallons of water seems to do as well as stronger mixtures. Spray first, before the buds start; second, when the buds are swelling; third, just before the flowers open; fourth, just after the blossoms fall; and sometimes it might be well to spray again about two weeks after the petals fall. At the station we found that we could save ninety-five per cent of some Janetons from scab; and the second year we had ninety-seven per cent free. Experiments in spraying year after year show that you can almost entirely do away with the scab and skin blotch. Bitter rot is more troublesome, and as it does not prevail in the vicinity of the station we have not had as good chance to experiment with it. In our experiments we were able to reduce it, but were not able to hold it in check as we would like. We could lessen it about one-half.

Root rot.—Of this I think I had better not say anything. One reason is, because I don't know anything about it. We have more of it in the southern part of the state than in the northern. We have tried different experiments with lime, salt, ashes and copper, and intend to keep on working with it, in the hope of gaining valuable experience.

Root gall.—I do not know what causes root gall and I have never seen any body who does know what causes it. We have tried many experiments with no decisive results. I have never seen this root gall in sufficient quantity to kill the trees, though we had some of it in a little nursery at the station.

DISCUSSION OF APPLE DISEASES.

K. B. Wilkerson.—In the nursery we found more root gall in the richer ground, where it was heavily manured, 200 loads to the acre. The second year the tree begins to die. Some said the wax used in grafting was the cause of it. I think the bunches of fine roots found on the trees just under the surface of the ground are from the same cause as the root gall. A tuft of roots may be caused by woolly aphid.

L. A. Goodman.—What does it cost to spray?

Prof. Whitten.—We have kept no account of the cost. We make so many changes in the spray, keep careful records and in many ways make the cost more in time, care and labor than would be necessary in a commercial orchard. I don't know the cost of commercial spraying. It varies greatly, costing some men four times as much as others.

Mr. Wilcox.—The difference in the amount of material applied, in the size of the trees, and in the size of the orchard and the lay of the land, make it difficult to count the cost per acre or tree.

J. C. Evans.—Why do so many Grimes Golden die at the collar?

Prof. Whitten.—I find trees of the Grimes dying from root rot.

J. C. Evans.—What I speak of is different from root rot. It begins above the ground. Root rot begins below the ground.

J. T. Snodgrass, Howell county.—In our part of the state the root rot is the worst thing we have.

Mr. Gilkeson, Johnson county.—There is a good deal of it in my section.

Prof. Whitten.—There is very little of it around Columbia. To prevent trees from dying give good cultivation. I believe trees would not die from drouth if properly cared for.

THIRD SESSION.—Wednesday Afternoon.

The meeting was called to order by the president.

First there was given a song, "The Old Ox Team," by the **Male Quartette**.

THE CHARACTER OF SOILS, LOCATION AND VARIETIES
FOR THE CHERRY ORCHARD.

By J. J. Kiser, Stanberry, Mo.

Our worthy secretary has assigned the above topic to me and requests a paper thereon. Left to my own judgment, he should have assigned the subject to better, at least more experienced hands; but if this paper will call out that much better part, the consideration and discussion by the society, with the statements of the ripe experience of its members which our efficient secretary so ably jots down, it may not have been written in vain.

The character of the soil in northwest Missouri, for which alone I can speak, is pre-eminently a fruit soil; our subsoil—a deep stratum of from twenty to forty feet of porous joint clay—can only be equaled if excelled by that formation known as the Missouri river bluff or Loess formation. This joint clay is in reality a soil in which if brought to sunlight and properly aerated, will grow the finest plants. The writer has seen clover and bluegrass growing luxuriantly in road cuts where every trace of surface soil was washed or worked out, and has successfully and without manure raised flowers on a mound of earth that had been brought up twenty-eight feet. Add to and over this a layer of from six inches to six feet of vegetable decomposition, mixed with drift soils and sand, for ages forming a loam in which is every element of plant structure and it would be hard to find a spot in northwest Missouri not adapted to the growth of trees adapted to our climate. Of course one might find some places too low for proper air or surface drainage or naturally inclined to be wet, springy or spouty. The cherry tree will not live with its feet in standing water, neither

ought anything but a willow be planted in such a place. My best growing and bearing trees are on the north side of the top of a small elevation, hardly to be called a hill, though trees are doing well on the south side of the same. Trees set near an artificial pond so that the high water mark is on a level with the roots of trees, are dead or stunted; while plum trees in the same situation show very little if any damage. The largest and finest specimens of cherry trees the writer ever saw were planted along the upper sides of cuts in roadways and along terraces on mountain and hillsides in Switzerland—trees over two feet in diameter that looked as though they might be a century old.

Varieties.—I approach this part of my subject with some degree of hesitation. Differences of soil, climate and even the markets may modify the choice of varieties. One of my earliest recollections is a large cherry tree that stood near the homestead in the old "fatherland." How well I remember watching the first burst of bloom in the spring, the development of the fruit, even the counting of the specimens that some day I might reach, the seemingly slow growth, and then, one morning the red tinge on a few of them—how slowly they ripened. Yes, I will confess to putting some of them into my mouth without picking them from the tree—I believe I can taste them yet, and when they did get ripe, great big, lusciously sweet, they were such as I never expect to see again, for they will not grow in this climate. When I tasted my first cherries this side the Atlantic I thought, oh! how is it possible to like such sour things?

When in Kansas City a few years ago, I bought a box of California sweets (?); small affairs they were, but I took them in haste to get once more a realization of my youthful memory. I tried one, two; in surprise I looked at the rest. They all looked alike. Tried another; found that all three tasted alike and in disgust I consigned the whole lot to the gutter.

But let no one understand that I don't like cherries, even such as we grow in abundance in northwest Missouri. In getting my allegiance Americanized I have also got my cherry taste adjusted and to-day I vote the American cherry a grand success. Fully ripe, they are good to

eat; mixed with sweet apples, or any kind for that matter, and sweetened to taste, they make the best pie on earth.

For a market cherry I would place the English Morello at the top of the list. True it went to wholesale destruction last winter, but are we going to quit planting all the kinds of fruit that were injured by that outlandish performance the weather clerk put on the program last winter? I think we will discharge him and the next one may take due notice and govern himself accordingly. Last winter has been called by some a test winter, but I don't understand it so. It is not to be expected that so many adverse circumstances and conditions will get up another such a combination in the next century.

The next best and very best for home and near-by market is Early Richmond. It must be used soon after picking. A neighbor told me that in canning they had mixed them with one-half strawberries to the great improvement of both, the combination keeping well when they had had trouble in keeping strawberries; that it gives a body and substance to that watery fruit that makes it much better. A few years ago I could not sell Early Richmond in my market. Nothing would do but English Morello. Yet to-day people have learned that the Early Richmond is much the better cherry and the demand has increased beyond the supply.

Montmorency Ordinaire, Suda Hardy and Ostheimer have gone to the happy hunting grounds along with English Morello and some semi-sweets. True they are not all dead, but all more or less damaged, being late they grew too late and were not matured to withstand the shock. Dyehouse wintered well and bore a small crop; it does not bear as young as Early Richmond, may do better later. I can see very little difference in fruit, though the trees grow more stocky. Wragg has stood the weather finely; it is small, sour, bitter and puckery, even sugar fails to make it eatable; not adapted to my situation and I shall grub it out. It is the true Wragg, as I got it from the Wragg nursery.

However, the best variety that has ever come under my observation in this country is one tree that stands in the yard of S. Chamberlain in the city of Stanberry, Mo. For years it has yielded its full crops of large cherries, pleasing to the eye and good to the taste, milder yet

than Early Richmond and more than twice as large with smaller pit. It stood last winter without damage and bore a full crop this year. Mr. Jones, cashier Farmers' and Mechanics' Bank, and I are having it propagated for our own planting. We have none for sale. This cherry will be watched and I predict that it has a future. I hope to be able next summer, with Mr. Chamberlain's courtesy, to send some specimens to the officers of this society.

PRUNING, PLANTING, CULTIVATION, GATHERING AND MARKETING OF THE CHERRY.

By W. H. Skinner, Bethany, Mo.

The subject assigned me for this sketch might well be divided into five separate papers, each of which, when it had fully and carefully considered its subjects, would be too long to present at a meeting of this kind, without becoming wearisome. I shall, therefore, but briefly outline the various work on the cherry tree, from the time it reaches the premises of the orchardist until its matured fruit is placed in the hands of the consumer, and in the beginning will say that my experience in planting cherries has not been as satisfactory as in planting other kinds of trees for my losses in planting my cherry orchard of 450 trees has been more than double what I have lost in planting over 2,000 other orchard trees. But this I attribute largely to the condition of the trees when received. I believe that if I could get cherry trees that were dug, and immediately shipped, instead of being cellared over winter, there would be less failure to grow, as of the cherry trees of my own propagation dug and immediately planted I have had no loss.

I shall somewhat transpose the text and touch first on planting, as my experience with cherries is that there should be but little if any pruning at time of planting.

Cherries should be planted in this part of the country only in the spring, as our cold dry winter winds have a tendency to extract the moisture from the tree, and the roots being short, with but little

surface to absorb moisture, the tree is very liable to die back partly, if not entirely, during the winter. They should, however, be planted in the spring as early as possible; that is as early as the ground is in fit condition to plow, and if possible before the buds begin to swell. They may be planted even after the buds begin to burst, but I have noticed that the earliest planted trees are more liable to live and make the best growth.

The cherry will grow on almost any kind of soil except a very wet one, but does best in a good sandy clay loam with a gravelly subsoil. This seems to furnish the necessary drainage and sustenance to produce the hardiest tree and best fruit. Before planting the ground should be deeply and thoroughly plowed and pulverized. The roots of the trees where cut or broken in digging should be smoothly cut and the hole in which the trees are planted should be large enough to admit the roots without bending; if it were possible to plow that deep, the hole should not be deeper than the ground is plowed, although I believe that cherries should be planted deeper than apples or pears. The roots should be puddled in soft mud before setting the tree in its place; the tree should be planted deep enough so that the bud or graft is at least two inches below the top of the soil when the hole is filled. The hole should be filled around the tree with fine mellow earth, carefully packed and tramped around the roots until they are well covered, and the earth should then be piled a little above the top of the surrounding soil to allow for settling, but the top two or three inches should not be packed. Greater care is required in planting the cherry than any other variety of fruit I have ever tried.

As stated above, I prefer to do but little if any pruning of cherry trees at time of planting; in fact, I prefer to plant small trees that need no pruning. In March of the next year after planting the trees should be gone over and pruned to shape the head; clip in the ends of the long shoots, keep the heads round, in the case of trees that grow like the Richmond, or conical with trees of more upright growth, and if the branches have not started thick enough to make a good head, cut back heavy enough to make them thicker, the aim being to shape the head as

near as possible to the shape of some well grown tree of the same variety. The following March when the trees are two years planted they should again be gone over and pruned with the same end in view; that is to make a well shaped head, cutting out cross limbs, heading back a too rampant growing branches; and where branch crooks or grows in a wrong direction it can usually be remedied, if taken in time, by cutting back to a bud that will start and carry its growth in the right direction. The third year the same treatment should be given, after which but little pruning will be needed, except to remove dead limbs, but these should not and with proper treatment will not be abundant for many years. In pruning the cherry, like all other trees, no fixed rule can be made that will apply to all, as no two trees are exactly alike; but the cherry being one of the most perverse of all fruit trees it is best for the pruner to have a well grown, full sized specimen of the variety he is pruning in his mind; this gives him the natural shape of the tree and he should so train his young sprout as to cause it to assume its natural shape and at the same time make a well formed tree of its kind.

One of our modern horticulturalists has said that the shape of the tree makes little difference with its bearing qualities and that each grower may form his own ideal shape of tree, and prune accordingly; but in pruning the cherry I would suggest that the pruner should have many ideals, as it is much more easy to make an ideal to fit a particular tree than it is to make all cherry trees grow to fit a particular ideal. No man should undertake to prune and shape the head of a young tree until he has studied the bud arrangement and growing characteristics of the family of trees he is about to prune, as the shaping of the top depends materially on the position of the upper head left after the branch is clipped; and in shaping the heads of young trees particular attention should be given that the cut is made so as to leave the upper bud in a position to start the new branch off in the right direction.

After the cherry orchard is planted the next thing is cultivation, and this should begin immediately and should be by a thorough going over with a smoothing harrow or some other shallow working tool so as to loosen the ground which has become more or less hardened by tramping while the planting was being done; again pulverizing two or three

inches of the top soil, thus making a dust mulch to retain the moisture; this cultivation should continue during the summer sufficient to keep the dust mulch and keep down the weeds. The number of times it will need this cultivation will depend somewhat on the season and the perseverance of the weeds. The cultivation the second and following seasons should be the same as the first, except that the first cultivation should be with a tool going deeper than a smoothing harrow, such as a cultivator or spring tooth harrow; about the fourth year the orchard should be sown to clover and left to grow during the fifth year, mowing it two or three times and leaving the clover on the ground to keep up the humus; and this will also have a tendency to check growth and bring the trees into bearing. About the last of May or perhaps earlier of the sixth year the clover should be turned under by a shallow plowing after which the cultivation should be kept up with the harrow.

Included with the cultivation and pruning of the cherry orchard should also be considered its care, and whether you class it with the cultivation or with the care, makes little difference; but the careful spraying of the cherry is one of the requisites that can not and must not be overlooked to secure success and keep healthy trees. The leaf spot and powdery mildew are the great enemies of the cherry in this country, and without being in some way prevented are likely to wake up the orchardist some fine spring morning to a knowledge that his cherry trees are all dead. The great loss of cherry trees throughout the northwest last winter, I am satisfied, was more from these diseases than from the extreme cold of February, 1899. By the middle of August, 1898, many of the bearing cherry trees had lost all their leaves from these diseases. The warm damp weather of September started a new growth, many trees put out new leaves and some were in bloom, the sap was up, they were in full growth when the snow and hard freeze came on October 17 and 18, and were killed then. If these trees had been thoroughly sprayed with the 50 gallon formula Bordeaux mixture when the blossoms fell off and again as soon as the fruit was gathered, the leaves would have held on until killed by frost, the trees would not have been growing in October and would not have been injured by the cold. I did not lose a single sour cherry tree last winter.

And now we come to the time of most interest to the cherry grower—the gathering and marketing, in which, especially the latter, I have had but little experience, as my orchard is just beginning to bear. But as I have given some thought and attention to this part of it, and have read everything on the subject I could find so as to know what to do when I get a crop, I will give an outline of my gleanings from others.

The cherry should not be gathered until fully ripe and then only when it is dry, as, if it is gathered when wet or even damp from rain or dew, it will quickly spoil. In all cases the fruit should be carefully handled, and the stem should be left attached to the fruit as the removal of the stem from the fruit will break the skin, allow the juice to run out and quickly injure the fruit. All defective berries should be thrown out as they will injure the sale of the remaining fruit, and at this time it pays to pack only the best fruit and to put it up in a manner that will be attractive, as there is about as much in the packing of the fruit toward selling it as in the fruit itself, perhaps more. Cherries should be packed in small shallow boxes or baskets which in no case should hold over one gallon, and handled so that they will not bruise or mash. As to the marketing of cherries away from home, all the questions of freight charges, commissions, and commission men, and of markets applicable to other fruits apply to cherries. I have given this but little thought for the reason that our home market has never been half supplied with cherries and I believe that it will be many years before I shall have to go away from home to find a market for my cherries.

WILL IT PAY TO PLANT CHERRIES IN MISSOURI?

By G. W. Hopkins, Springfield, Mo.

With the record of the past few years of fruit failures in Missouri staring me in the face, and the unknown possibilities of the future before me, it is with some degree of reluctance that I shall attempt to say what fruit will pay. The cherry has as yet been planted

in south Missouri only in a small way. Most every one in starting a new place will set out a few trees, but orchards exclusively of cherries are few and far between. There seems to be only two varieties that are worth planting in this locality—the Early Richmond and English Morello. The Montmorency, it is said, does well, but only a few have ever fruited it.

The sweet cherries are not worth planting here, as they are very tender in the bud, and possibly one year in ten they may not be killed. If they are not killed in the winter or early spring, when they begin to ripen, the rains will crack the fruit and the birds destroy the crop. The curculio, the same that stings the peach, is very destructive here to the cherry.

There is no question but cherries will pay well in south Missouri if there was any certainty of a crop. The Early Richmond comes in before strawberries are gone and we have the whole southern country for a market. Three years ago I shipped Early Richmond to Memphis, some of which sold as high as \$3.50 per crate.

Of course there is big money in this, but I have not sold a cherry since. Now there may be some sheltered places in south Missouri where the climatic changes are not so sudden, that cherries may be grown with profit. To those living in such favored places I would say plant cherries. But after thirteen years of experience and observation in the vicinity of Springfield, I would say it would be rather hazardous to plant orchards of cherries for commercial purposes unless we could have assurance that the climate and seasons would change for the better.

DISCUSSION.

Maj. Holsinger.—I have several thousand cherries in bearing and have made more money from the cherry than from any other fruit. I favor the Montmorency and if I had to forego any kind it would not be the Wragg. I think the Wragg is better than the Early Richmond. For four kinds I would take Early Richmond, Montmorency, English

Morello and Wragg. These four make fruit through the season. The Wragg I have were propagated in Alabama, but is the same as the Iowa Wragg. My cherry trees planted in 1876 have paid well. We are burning them this winter for firewood. The first acre of these cherry trees I planted made \$500 per acre each year it was in bearing. If the others will last as long and pay as well I will be well pleased. Some of our cherry trees die in full leaf. I don't understand the cause.

L. A. Goodman.—Of all the fruit I have grown at Westport the cherry has paid me best. Ten or twelve dollars per tree per year is not an uncommon yield. They should be planted in the proper soil and given the best cultivation for four years; after that time the tougher the grass sod the better. Not for sixteen years has the grass been broken. The roots are sensitive to being broken. When they are cut they begin to decay. The soil must be dry and not underlaid with hardpan.

Question:—What is the best stock for the cherry?

The discussion showed the Mahaleb to be the stock in common use.

Mr. Callaway, of Illinois, said the common Morello was the best.

Mr. Kiser saved his cherries by planting plenty of Russian Mulberries for the birds; they much preferred the sweet little berries to the sour cherries. His loss from birds was nothing in his cherry orchard.

Question:—Is clover a good crop for a cherry orchard four years old? And would you let it stand or cultivate alternate years?

L. A. Goodman.—Clover is good. I would never cultivate after four years.

J. M. Irvine, of Buchanan Co.—At the last meeting of our county horticultural society we discussed the cherry. It was said to be the most profitable fruit. Some are growing Dyehouse instead of Early Richmond. It is sometimes earlier and always as early as the Richmond. Montmorency, English Morello and Wragg are also grown.

Maj. Holsinger.—My Dyehouse has not come into bearing.

J. E. May.—Is there any difference between the Large Montmorency and Montmorency Ordinaire?

Maj. Holsinger.—None whatever.

Mr. Baxter said cherry trees on Mazzard stocks sometimes did better than those on Mahaleb stocks.

Mr. Butterfield.—The Mazzard sprouts.

Mr. Baxter.—I said the Morello is the best stock for the cherry. This question was discussed very thoroughly in Illinois by Dr. Hull and others years ago.

Miss Park, Greene Co.—We are not all discouraged as badly as Mr. Hopkins in the vicinity of Springfield. I know one man who will plant a ten acre cherry orchard next spring.

INSECTS ON THE CHERRY.

Prof. J. M. Stedman.

There are not so many insects which prey upon the cherry as upon the apple. The New York weevil and the imbricated snout beetle feed on the young and tender bark and foliage and sometimes upon the buds before they open in the spring. We know little of the life history of these insects and must fight them upon the tree itself. At a time when the trees are leaved out it is difficult to reach the twigs which are covered with the leaves, but it can be held somewhat in check by spraying with the arsenate of lead.

Tent caterpillars of both species work on cherry trees, and can be fought as spoken of in the apple. The fall web worm can be twisted out with a forked stick if you take it in time. The cherry borer is found only in a few localities. It is not general in the state. It is difficult to fight in a very successful way. Use the same wash that I recommended for apple borers.

Cherry leaves are eaten by a number of lepidopterous insects. Spray with arsenate of lead in preference to Paris green, London purple, arsenate of lime or soda.

To make arsenate of lead use 11 ounces of acetate of lead and four ounces of white arsenic, to seventy-five or fifty gallons of water. This formula is for any biting insects on the cherry. The leaf crumpler will damage the cherry more than the apple. The canker worm also feeds upon the cherry. Give all of them the arsenate of lead.

The curculio is difficult to fight; much more so than in the case of the plum. It makes the wormy cherries. These do not drop from the tree like the plum, but hang on and ripen with the good cherries. It is often difficult to distinguish them from the good ones, till you eat them. Cherry trees are usually too large to jar successfully. Spraying does not pay, rarely reaching fifty per cent of them. Birds can keep these insects in check.

Maj. Holsinger.—Have you any trouble with the peach borer in the cherry? We have had to worm our cherry trees this year as well as our peach trees.

Prof. Stedman.—Use the same remedies as for apple borers.

N. F. Murray.—We have cherry trees where the poultry has continual access. The cherries are almost entirely perfect. I think this is the practical way to control these insects.

Question:—Our cherry trees are dying of some fungus disease which commences at the root, then extends up the trunk eight or ten inches. On examination I have found between the bark and sap a fungus growth which is about one-twelfth of an inch thick. At first it is white, but afterward changes to a brownish yellow. Can it be caused from the stock upon which the bud is made? If so what stock is best to use? Is there any known remedy for the disease? If something is not done soon to check it, we shall have to abandon cherry planting in Callaway county.

J. H. MARION,

Fulton, Mo.

J. C. Whitten.—The brown rot in cherries is the same as that in plums and peaches. This has not been very serious since I have been in the state. It is difficult to fight it by spraying. Bordeaux mixture turns the foliage yellow. If you could destroy the rotten fruits or remove them from the orchard it would lessen the brown rot for the next season. I can not say what is the disease that Mr. Marion refers to in his letter, though I think it may be the same as the apple root rot.

PLUM ORCHARDS.

THE OPPORTUNITY FOR WIDER PLANTING.

By S. H. Linton, Marceline, Mo.

That we may better understand the various varieties now in nursery catalogue it is proper to give the origin, order and group of plums as laid down by scientific authority. The *Domestica* or European types (*Prunus domestica*) native to western Asia, including all of the old time plums, Green Gage, Bradshaw, Yellow Egg, Damsons, Reine Cloud. The Chicasaw types (*Prunus Augustifolia*, or *Prunus Chicosa*) belongs to the southern states (on a line with southern Delaware southward), are such varieties as Newman, Caddo Chief and Lone Star. The American type (*Prunus Americana*) is composed of the common wild plums of the more northern part of the United States, and including the territory from Michigan west to the Rocky Mountains thence south to the Gulf. The Wild Goose or *Hortulana* types (*Prunus Hortulana*) from the group of Wild Goose, Wayland, Moreman, Golden Beauty and Miner. "No doubt hybrids of the native and Pacific coast plum." The Sand plum (*Prunus Watsoni*), native to Kansas and adjoining states. This type is but little known or cared for by horticulturists. The Beach plum (*Prunus Maritima*), native to the north and eastern Atlantic coast. Having but little value in fruit, but the trees are beautiful as an ornament. The Pacific Coast plum (*Prunus subcordata*) is a natural product of the forests of Oregon and California, but little known in domestication except in the individual of the Sissin type. Within the last decade has come the introduction of the Japanese type (*Prunus Triflora*), "probably native of China," says Prof. Bailey. During the brief stay the Japanese plum has made many warm horticultural friends and generally adapted itself to the climate and soil in the United States in all territory south of the north line of Missouri, and will undoubtedly be of great value, and a grand acquisition to the already large group of fine plums. By careful breeding some choice varieties of the Japanese type can and will be produced that will withstand the severe winters of the more northern

states. Prof. L. H. Bailey says: "I am still convinced that the Japanese plum has come to stay." Here in Missouri we can add to this by saying that we are truly glad that they have come. With the addition of the Japanese plum the season is extended from June to the first and middle of September, and in some seasons even into October. Thus far we have covered in detail the various groups of the plum. Much we desire to delineate the characteristics of some of the leading valuable varieties that should be more extensively grown for family and market use, but space and time under the occasion forbids our doing so. Plant food supply and the proper food ration is of vital importance and may not be generally understood. The plum being prolific in fruit is necessarily a gross feeder and must have abundance of food combining the proper ration. The three elements in proper ratio which give both wood and fruit growth is, nitrogen two per cent, available phosphoric acid seven per cent, potash nine per cent. This fertilizer should be applied in quantities of 500 to 1,000 pounds per acre annually. The fundamental laws of systematic or scientific horticulture is based on proper food ration. The best soil for plums is a heavy clay underlaid with a gravelly subsoil capable of conserving moisture. The color of the top soil has but little consideration in selecting a proper location for planting. More depending upon the proper chemical analysis of the soil, combining with complete drainage. Hillsides, points and ridges, with other advantages being favorable, make good locations for plum orchards, such locations are numerous in this state. We as citizens of this great state of Missouri know no limit or scarcely any bounds to the cultivation of the better and more profitable varieties of plums. "Of all the important fruits, the common plum has the smallest American literature," says Prof. Bailey. This is as much as to say that the culture of the plum, of all fruits, is most neglected, and what is true in this case in the eastern states is also a fact in Missouri. Then the fruit growers of Missouri should wheel in line with their best and most direct financial interests and plant more good plums which make a quick return in profit, and greatly assist in bridging over the expense of planting and growing other fruits that take longer to produce a crop. Progressive horticulture, toned with experience, polished by science, the products reaped with the golden

sickle of success, stored in the broad, liberal minds of the intelligent grower, the joy and pleasure divided with the family and subdivided with friends and acquaintances is the theme sought for. As we have often said, in our talks and writings before the public, "of the more than 44,450,000 acres in Missouri, three-fourths to four fifths of this vast area is, by nature, adapted to growing fruit. The undulation of the surface, some places quite abrupt, the main part more gently rolling, forming hills and ravines, draining the soil of water, the condensed air falls into the ravines and is carried down by under currents to the branches and creeks, from thence to the great river systems of the state, which rushes these currents on to the Gulf to cool the sun-parched shores and purify the air of the yellow fever microbes of the far south. These natural conditions not only developed in part the unsurpassed fruit resources, but greatly assists the healthfulness of our beautiful country. In truth and in fact there is no serious disappointments in fruit growing in Missouri, to them who have the sunshine of horticulture in their soul. The practical horticulturalist is ever prepared to find a whole sermon, an hour's study in every tree, shrub and plant, and if perchance his labors are not rewarded in dollars and cents by a fruit product of the orchard or garden, he is able to attribute the cause and proceed at once to continue the lesson in nature study, reading Divine revelations from each leaf, blade and stem.

PLUM, VARIETIES—DISCUSSION.

Mr. Baxter of Illinois.—I lost 300 trees last winter. I want to know what to replace with.

J. H. Karnes, Buchanan Co.—My experience is with the native plums. Eastern and Japan are not profitable. Wild Goose is always profitable. I have the Wolf, Miner, Mariana, Potawatamie, Marion and Newman. Wild Goose has paid best. Wolf is a freestone, it rots. Mariana is most worthless, except Potawatamie. I can not market the latter at all; too small. The Abundance died this last season. I have Bradshaw, Lombard, Lincoln and other European kinds. None of

them are good. Arkansas Lombard is not very good. Blue Damson is one of the best of the Europeans. I have no experience with the Gold. Mr. Fleming gives it a good recommendation. Burbank is no good. Wickson stood the winter, not fruited. My blue damsons are all on own roots.

Prof. Whitten.—We have about 150 varieties of plums at the station, American, European and Japan. No European is worth growing in this state. The Shropshire damson and the Lombard rots. The best plums for us are the American. I would name Forest Rose, Miner, Wild Goose, Wolf and Wyant. The latter, fruited only one year, is large and of good quality. Wayland is a good late kind, splendid keeper. Golden Beauty is yellow, small, good keeper. World Beater makes good jelly and jam.

Abundance and Burbank are the best Japs for Missouri. They rot, but not so bad as the Europeans.

J. J. Kiser.—I have 25 or 30 varieties of plums. I would name Forest Rose, Poole's Pride, Wild Goose, Potawatamie and Robinson. I sell Wild Goose for \$2 per bushel. The Abundance is very fine; as good as the cherries in the old country. My Abundance are practically all dead. Burbank half alive. Gold, one hundred trees, all dead. I am going to plant again. I am not discouraged. I never expect to see such another winter as last. I would name Wild Goose, Potawatamie and Robinson to make money.

Mr. Murray.—Do you find anybody foolish enough to buy Potawatamie the second time? (No answer.)

Question:—Are you going to plant the Gold again?

Mr. Kiser.—I have that under consideration.

Mr. Baxter.—I have 100 Burbank. They did not winter kill. Abundance not so hardy. Shropshire damson half killed. Other Europeans half killed. Wild Goose is the only native variety I grow. It gives a good crop almost every year. I have sprayed nine years for the curculio and rot; succeeded some years; last year lost.

Mr. Irvine.—Mr. Fleming will plant Abundance upon clean, high ground, remove all rotten plums as soon as possible, thus hoping to escape the rot. He has made money on blue damsons planted on high land. He planted 1,000 Gold trees this year.

A member.—I have some success with the Japs.

Mr. May, Adair Co.—Abundance winter killed last winter. They bear young and rot. I have one tree of the Gold four years old. This year it bore two fruits, the size of Wild Goose.

PEACH ORCHARDS.

N. F. Murray.—I hope the past winter did not freeze all the peach interest out of this audience. Our trees are not nearly as bad as we thought. I would just as soon plant peaches for profit in North Missouri as an apple orchard. I grew them successfully thirty years ago and I believe it can be done again.

W. G. Gano.—I don't think we are discouraged on the peach questions around Kansas City. We used a little common sense and did not saw our peach trees off at the ground. We shortened in a little more severely than in ordinary years. Very few of our trees are dead. The growth was very fine, and they entered the winter in much better condition than a year ago.

L. A. Goodman.—Since last spring I have received several very scorching letters for the instructions I sent out. The word "dehorn" seems to have misled many. They cut their trees too short, some left only a few inches of the large branches and others cut off at the ground. We took off all the wood three years old on the old trees, and all one-year wood on the young trees. Those who pruned rightly are well pleased. In an orchard of 30,000 I did not lose any trees to speak of.

J. J. Kiser.—I received the secretary's instructions to dehorn. I cut the trees back and they made a growth of three to six feet. I believe I can give you a pointer. In the late fall, after most of the leaves of the peach have fallen, you will sometimes find a tuft or bunch of green leaves upon the ends of twigs; cut that off. It contains green sap which tends to weaken the tree. They will be healthier and hardier without these green leaves and twigs. I have fruit buds upon the peach for next year.

T. B. Chandler, St. Francois Co.—We are not discouraged. I live 89 miles south of St. Louis. We had quite a little sprinkling of peaches this year. Some trees were injured. Those who got too late a growth injured their trees. We have fine prospects for peaches next year.

J. C. Evans.—I believe a tree can be dehorned and still live. I have observed many trees. In every case where the trees were cut early immediately after the hard freeze in February, no matter whether cut much or little, they died. While those cut later as growth was starting came out all right.

J. T. Snodgrass.—I dehorned 22,000 peach trees within three inches of the ground. Not over ten per cent of them grew, and very few of these above the bud. I cut them early. Won't do it again.

Mr. Baxter.—I have a peach orchard of 500 trees, set in '94, subsoiled and cultivated well ever since. Not one hundred of these trees are alive to-day. All the living ones are Elberta. In another orchard, of the same age, of 350 trees all are dead. These were well cultivated. Another orchard of 300 trees, set the same spring, not cultivated for the last two years, strawberries in the rows, are all living.

Mr. Gilkeson.—I had 1,500 peach trees; they are nearly all dead; not more than twenty-five per cent living.

APPLE TREE ROOT ROT.

By Prof. H. von Schrenck, St. Louis.

He thought it would prove impracticable, if not impossible to successfully use fungicides in the soil to prevent root rot. In some parts of Europe they burn the soil, from which deceased trees or vines have been taken, to kill the injurious fungi.

Mr. Goodman said that trees affected with the rot which had been treated with blue stone seemed to look better.

Prof. von Schrenck feared that chemicals sufficiently strong to kill the fungus in the soil would also kill the tree. He thought that if

trees could be made to root from the scion, that we might find varieties not subject to root rot, and that we could grow other varieties upon these immune varieties by top grafting.

J. J. Kiser spoke of a horticulturalist who tried to graft our common kinds of apples upon the wild crab, but it proved impracticable.

L. A. Goodman.—We can get trees to root from the scion by using a very short root and a long scion. I think it is best to have all trees upon their own roots as soon as possible. A nurseryman can tell when a tree is upon its own roots by the form of the roots. After two years the scion gives its characteristic root growth even to a seedling.

Prof. von Schrenck.—It might prove profitable to trench around infected areas to prevent the spread of the root rot. It is a discouraging task to try to get the root rot out of the ground. Thousands of dollars have been spent by European governments in fighting similar fungi in vineyards.

I am anxious to get as much material as possible for the study of this rot, and will send P. O. franks to those who will send me specimens.

Brother Goodman:

Dear Sir:—In your request to me to write something about stone fruit, you made a sad mistake. I do not know near as much about any kind of fruit growing as I thought I did when I began the business six years ago. At that time I set out about 2,400 fruit trees, most all apple. I did, however, set out 200 peach, and 200 plum. The peach, because I was in a tight place and wanted something that would come on quick. Like the boy after the ground squirrel "I had to have it," and by scattering manure and ashes under the peach trees and working it into the soil with a double-shovel and small mule, I got peaches to my heart's content. One lady looked at the baskets of peaches then at me and said: "You do not look as if you had sense enough to grow such peaches." That's the way I thought about it too; but then the trees were altogether too full and I kept picking off all that did not suit me while they were growing; but they paid for the labor and if I never see another peach on those trees we are even. I have some six or eight varieties, but the Elberta are all that paid any money. Some were set out on land that was so rocky that it was impossible to cultivate, so I dug around them some for a year or two but never saw a good peach from them. One year, not thinking I knew enough to spray, I hired a professional sprayer; he knocked off

both little peaches and leaves from ten Elberta trees and I knocked off his wages. So I have quit professional sprayers. We had a heavy hail storm which knocked off a good many plums, but did not hurt our peach crop in the least. Blue damson and Forest Gem and Wild Goose had enough on them, and bid fair for the next crop. Apples were beaten up altogether too much by the hail to suit me, but they may outgrow that somewhat. Should like very much to attend the meeting but work is crowding here and have about eaten up last year's peach and apple crop. With best wishes to all.

Respectfully,
J. P. COWDIN.
Mt. Grove.

FOURTH SESSION.—Wednesday Night.

The program opened with a song by the male quartette.

CARE AND MANAGEMENT OF STREET TREES.

By H. C. Irish, Missouri Botanical Garden.

A general study of the condition of street trees in many of our larger cities reveals the deplorable fact that a very large per cent of both the newly planted trees and the older ones are rapidly going to decay as a result of careless planting, neglect, improper pruning, unnecessary mutilation, vandalism and the attacks of injurious insects and fungus diseases. In St. Louis the cyclone of 1896 wrought havoc with many trees in some sections of the city, many of which were damaged beyond reparation either by being killed outright or so badly injured that they could not long survive. Many others which might have been saved by proper care were allowed to die from neglect. Others were killed by too much pruning, which was a shock equal to, or perhaps greater, than the cyclone itself. Added to these other agencies which more or less tend to check a healthy development such as mechanical and chemical impurities of the air, an unsuitable soil, and a confined root area and it sometimes seems marvelous that so many trees live as long as they do. The development of large park systems is rapidly increasing and many streets possess beautiful avenues of trees showing the possibili-

ties of growing these plants in such unfavorable situations with proper attention. Probably fewer mistakes are made in the selection of varieties and the work of planting the young trees than the other necessary and constant attention which is subsequently required. However it seems desirable to call attention to a few kinds which are among the best and which were reported to Coleman's Rural World a few weeks since.

The list of trees known to be well suited for street planting in St. Louis is very limited. The qualities essential for a good street tree are that they must be able to endure the smoky or otherwise impure atmosphere of the city, grow in poor soil, and not be sensitive to neglect or abuse by improper pruning or careless mutilation. Furthermore people are usually anxious for immediate effect and therefore want a rapid growing tree as well as one prominent for good looks and free from the attacks of insects or fungus pests. There is probably no tree that fulfills all of these requirements, but the one which seems to possess the greater number of good qualities for St. Louis is the American sycamore (*Platanus occidentalis*). It grows rapidly, is easily transplanted, and can probably stand more severe pruning than any other tree. This is the most commonly planted sort in the older and more thickly settled portion of our city.

The silver maple (*Acer dasycarpum*) is also very common, even more generally planted than the sycamore in many parts of the city. It grows quite rapidly, is very decorative when in leaf, and is quite long lived. This tree is more sensitive to gases and smoke than the sycamore and will not stand as severe pruning. Its dense mass of foliage with the silvery color on the under side of the leaves is very effective.

The cottonwood, or Carolina poplar (*Populus monilifera*) is occasionally planted. It is one of the most rapid growing sorts we have and where immediate effect is the most important item this is very desirable. It soon forms a large, handsome tree, but is comparatively short lived, and the branches are easily broken by high winds. When possible only the staminate specimens should be selected, as the blossoms of the pistilate ones are constantly falling to the ground during the flowering season.

The tulip (*Liriodendron tulipifera*) is another quick growing, very handsome tree sometimes seen on our streets. With age an abundance of flowers are borne which resemble tulips. The trees are difficult to transplant except when very young, and they have the objectionable habit of beginning to drop their leaves early in summer.

The white or American elm (*Ulmus Americana*) is very poplar in many cities, especially in the east, but rarely seen here. It has many commendable qualities, long life, moderately rapid growth and wonderful beauty of form. It is objectionable, however, on account of various species of caterpillars which often defoliate the tree, and besides its irregularity in growth makes it difficult to secure a uniform avenue of trees.

Sweet gum (*Liquidambar styraciflua*) is a very slow growing sort, but one of the most desirable for street purposes. It becomes a medium sized to large tree, with a rounded or somewhat tapering form and very symmetrical in habit. The autumn foliage effects are especially beautiful when the leaves turn from their glossy green to a purplish crimson. It is entirely free from injurious insects and fungous diseases.

The sugar or hard maple (*Acer saccharinum*) is another very slow growing tree, but otherwise a very good one for street planting. It does not give the beautiful autumn foliage effects of the sweet gum, but possesses the other good qualities of the latter. The wood is strong and the branches are not easily broken by winds.

Other species may be preferable for special purposes. These are among the best. There are objections to all of them. Some of these objections may be overcome by a little care. The caterpillars may be kept from the elms; the silver maple, sycamore and poplar may be timely pruned and will not then be as easily broken by the winds. It is important that some system be inaugurated for the planting and care of street trees as well as the proper selection of varieties, otherwise all varieties will either fail or give very unsatisfactory results, while with proper care the number of successful kinds may be greatly increased.

It seems important to call attention to some of the mistakes that have been observed.

In the newer portions of the cities it is sometimes necessary to change a grade where fine specimens of trees are growing. Too often

are the trees sacrificed where they might be saved. Very large specimens, especially the elms, are often successfully moved long distances, but of course at great expense. They might be lowered, however, with very little expense while the grade was being cut away, and even moved a short distance either one way or the other. Late summer or winter is perhaps the best season. The tree should be firmly braced by running ropes from the top out in three directions. The grade beyond the roots should be cut to the required level, after which the tree can be undermined and lowered without disturbing or exposing any more roots than necessary and will be surrounded with surface soil in which growth will continue without having received much of a check. When the grade is to be raised about a tree the soil is often banked close up about the trunk. This practice is dangerous to the tree where the grade is raised a foot or more. The trees may live a few years but those roots which should be near the surface are too deeply covered to do their work long. A better plan is to curb or place a box around the base with the bottom spreading many feet and the top narrowing close around the trunk even with the surface of proposed grade. This seems to be as safely practiced as attempting to raise an old, well established tree and is very much less expensive.

One of the supposed enemies to the growth of street trees is the laying of granitoid sidewalks and macadam or asphalt pavements so close around the trunk. There are many trees, however, in such places that have made a healthy growth for years and still show no signs of injury by such treatment. It is claimed by some that pavements may be a blessing in that they prevent the escape of moisture which rises from lower strata of soil and thus keep the roots constantly moist. However in many kinds of soil the moisture and nourishment may soon become exhausted making it necessary to adopt some means of irrigating. It is also important that the ground be well drained, but as roadbeds must likewise be thoroughly drained there is comparatively little danger from this source. With a few feet of exposed soil about the base of the tree sufficient water can be applied to penetrate to the most distant roots and the system of drains will be sufficient to carry away any surplus, thus avoiding stagnant soil in which most plants will not long survive. Another method of supplying moisture which has been prac-

ticed to some extent and with apparent perfect success is to place a few vertical drain pipes about the tree with the upper end just above or even with the walk and covered with an iron grate. These should connect with horizontal drains below. The moisture is not only more evenly distributed in this way but the soil is better aerated. With the soil in such a condition as to secure perfectly healthy root action half the battle in growing street trees is won, for a tree with healthy root action can endure much ill treatment from above. However if the top is neglected and allowed to continually become diseased and otherwise mutilated the roots will accordingly suffer regardless of the kind of soil in which they are planted. Due attention must therefore be given the top.

As previously stated many trees have died from lack of pruning while others have been killed either by excessive or otherwise improper methods of pruning. Some trees are thus ruined before they leave the nursery, but more are injured after they have been moved to the street as unskillful and unintelligent labor is more frequently employed there than in the nursery. In fact, as a rule, but few intelligent, skillful and conscientious laborers seem to be employed for the work. Many possess one or perhaps two of the elements but lack the third, while all are essential to properly do the work. One mistake is in waiting too long before doing any pruning. The plants becoming overgrown as it were, with many branches that reach so far up and out as to be easily broken by winds, or if pruning is begun before the wind does its work it will be found necessary to cut larger branches and remove so much top that the trees will be more or less weakened by the shock. Pruning should be done often and a little at a time. Again in removing side branches the cuts are not made close to nor even with the main branches. A portion of the branch is left which soon begins to decay and this in time soon spreads over the entire tree. Cuts of this character should be made parallel with the branch and close to it and the wound thus made immediately covered with grafting wax, paint or perhaps best of all coal tar to keep out insect enemies or germs of fungous diseases until a new growth covers these parts. Careless workers often badly split the wood near the cut but this can mostly be avoided by first sawing part

way from beneath, finishing the operation from the upper side of the branch.

The street trees suffer much from many careless and thoughtless pedestrians. Hostlers tie their horses to them, boys whittle the bark and drive nails into their trunks. Some protection is afforded by wrapping a galvanized wire screen of small mesh about the trunk. This screen should be fastened to the tree and not to an independent stake to prevent the wire itself injuring the trunk. Insects and fungi require constant watchfulness. Space will not permit their treatment here. All wounds made by them or from other sources should be carefully scraped and coated with paint or coal tar.

To overcome the many difficulties and successfully grow fine avenues of shade trees requires the combined efforts of individual and community. In many of the eastern cities various organizations have been formed to encourage the planting and proper care of street trees. Their labors have been abundantly rewarded. The system which has been in vogue in Washington is often mentioned as being one of the most successful in operation. The whole work is placed in the hands of a commission composed of two public spirited citizens who understand the work and act without compensation. The commission employs a superintendent who gives all of his time and attention and has immediate charge of the entire work. The necessary expenses are appropriated by the city. The plants are grown in their own nursery, and are thus cared for from beginning to end by some competent labor. Brooklyn has "The Tree Planting and Fountain Society," the object of which is the promotion of planting and protection of trees, the erection of drinking fountains and to otherwise render the city of Brooklyn attractive. It is entirely an organization of private citizens.

Dr. Herman von Schrenck, Washington University, spoke of park and street trees and the public spirit in favor of such trees, which has been so cultivated in some of the eastern cities that even the small boys consider themselves the special guardians of the trees. In Brooklyn every man is a special policeman with authority to watch and

protect the trees in front of his own premises. A majority of our people do not realize with how little work and care they might beautify their grounds and streets by planting trees. Trees are our best friends. They conduce to the physical, intellectual and moral welfare of the people. It only needs one or two persons who strongly feel the need and importance of such things. In Boston they have a club whose business it is to look after such things. They have so educated public sentiment that the small boys are the best policemen to look after the welfare of the street trees. I have seen a small boy make a truck man remove his horse which he hitched to a tree.

Music by male quartette.

Recitation by Master Martie Read.

NECESSARY PRIDE.

By Lulu Wayman, Alvord, Mo.

As nature conforms in a greater or lesser degree to man's ideas, when directed by his head and hands and is transformed and perfected on certain lines to meet the requirements of a progressive age, it is equally true that human nature is directed and governed by the plaudits and criticisms of his fellow man. The love of approval is scarcely pride in the noblest sense of the word, but doing right because it is right, and being never weary in well doing are the essentials in grand character-building.

Perhaps no one word which it became Mr. Webster's duty to chronicle in his vocabulary has a greater diversity of definitions and more shades of meaning than this word "Pride." In one sense it is conceit, vanity, arrogance, and like qualities fostered by a distorted idea of what is true life and living, but there is a sense of the word that is inspiring and is a prime factor in all great and noble achieving.

True self esteem or necessary pride in strict fidelity to duty makes heroes; nor are great heroes of mushrooms grown, for by the time their deeds of valor have been heralded over the continent their biographies

are out and we find, as in the life of Dewey, they have always been great and noble.

"Lives of great men all remind us" that in a large degree their inspiration toward greater attainments has ever been an innate pride in doing well all that they found worth doing. This world is more than half full I think of Adam Bedes, who "wouldn't give a penny for a man as 'ud drive a nail in slack because he didn't git extra pay for it." This sentiment of the immortalized Mr. Bede holds as a principle in every calling. When we see and reap benefits from a higher civilization and can mark each succeeding year with scores of helpful scientific discoveries and improved methods we know that many have labored well and patiently, whether there was extra pay in it for them or not, usually not.

Speaking of progress and pride reminds me of Missouri! I have heard citizens of other states criticize us for using that word "proud" so much. They call it a colloquialism of the native out there, but I think it a very necessary word, one that our state has a greater use for than many a sister state for it has been "to the stars" through more difficulties than Kansas land ever heard of. These whiteoak ridges. Those stony hills, have covered Missouri all over with glory in a horticultural way and has made the state world-renowned as the land of the "Big Red Apple." So let it be with necessary pride that we appreciate not only the opportunities of this meeting but the benefits for years the field of horticulture has derived from the zealous and efficient work of veterans in the cause like Evans, Goodman and Murray and others who have taken an essential pride in the fact that this work was well worth doing and have done a great work well.

Song by the male quartette.

ESSENTIALS OF SUCCESSFUL ORCHARDING.

By Prof. J. T. Stanley, Cainesville, Mo.

The chief obstruction to progress in the horticultural and agricultural pursuits is the belief so prevalent that no knowledge is of any great serviceable value except that which comes through individual ex-

perience. Scientific farming is yet so unpopular with the masses that there is little hope of immediate improvement in methods such as would bring about the higher results sought.

There is no other industry that has so persistently ignored the advance of science in its application to the principles underlying its progress, and yet there is no industry that has been more favored through scientific research. Every other industry seeks to know what research has revealed and is ever prompt to seize the advantages offered. Farming alone is still consulting the Delphic oracles and seems wedded to the traditions of the past. With a very large per cent, it has become a part of a fixed creed that little, if any, serviceable value can be acquired through any source other than that of individual experience. By them the book farmer is regarded as a visionary fellow, and he who would advise as a necessary part of his farmer's equipment, a knowledge of chemistry and biology in so far as such knowledge relates to health, growth and fruitage, is looked upon as one misguided and the feeling for him is that of pity or contempt.

If experience were the gateway to success, most men would be successful. The world is full of men of experience but unfortunately most of them have little else to show. Many there are who have battled with life through more than half a century without taking a single fortress; at any rate they have captured nothing but themselves. Failure is plainly written all over them, yet they undertake to advise others, feeling they have a right to do so because they are men of experience, and since their weather-beaten aspect shows clearly enough they have been in the storm, and since their counsel bears the mark of experience it is eagerly sought.

We observe that all men desire to employ attorneys, physicians and artisans who are schooled in the principles of their respective professions. In all the trades and professions skill is taken at its full value, until we come to farming, while here we find the prejudice to scientific farming so deep seated that even a hearing has been denied, and through the perverseness of the tillers of the soil will still be denied for some time to come. Farmers as a rule reject the truths revealed through research and experiment as the foolish dreams of city farmers

and hug to themselves the follies and traditions of the fathers. They look with suspicion upon the counsel of our experimental station because the men conducting matters there have been known to speak of the chemistry of soils and the phenomena of plant life. That much scientific nonsense has been written we are aware, mere stuff it is, but all truth yet brought to light has been dug out from under just such stuff and not infrequently we get hold of error for a time, but the fact still stands that if we would reap an hundred fold we must interrogate nature and act upon her suggestions.

We have put the horticulturist and agriculturist together so far because it suited us best to do so. It is not our purpose to lampoon the farmer and fruit grower, but we would like to shampoo some of them if we only knew a decoction that would cut away dandruff and moss, induce a heavy sweat followed by much depletion and exhaustion. There might then be some chance for them. Verily we say they must be born again. We speak plainly; being farmers and fruit growers ourselves, we feel that such statements from us will be received with less prejudice than if they came from higher authority.

We say then that the first essential to successful orcharding is a horticultural education, and no man has a reason to expect the highest reward for his labor without it. Experience is of no serviceable value unless it has a basis of intelligence on which to rest. The teacher who would by experiment illustrate atmospheric pressure has his trouble in vain, unless he has the pupil so taught that the experiment answers some question underlying natural phenomena. The pupil observes a strange behavior of matter under manipulation, but has gained no truth to guide him in the solution of future problems. We say, too, that no experience in horticulture is of any positive value unless it rests upon information through which it answers some question affecting plant life. Some question of the economy of nature relative to health, growth or fruitage, unless there has been previous preparation the observer is practically untaught, yet such observations are often called experience.

Jefferson was right when he said: "He who would rely upon his experience to guide him should always remember he has a fool for a teacher." That is all there is in experience when it stands upon itself. Very little standing on nothing. It reminds me of the two black snakes

that had a difficulty and each snake concluded to swallow the other. Beginning at the tails the swallowing went on until each had completely swallowed the other and there was no snake at all, nothing there but the two swallows. Question:—What had become of the snakes? Reduced to a mathematical formula the question stands: No snake plus no snake, minus two swallows equal two snakes; no knowledge plus observations that mean nothing equal experience plus two snakes.

Some years ago we saw a definition of experience that seems to fit the case. It was given in connection with the career of a Kansas politician. You know they have an experience down there, all of them, Mary Ellen included. Long may she wave. The definition was this: Experience is what a man experiences while experiencing his experience. That sounds at first like idle jingle, but turn it over two or three times and look at it and you will see that it is all there is in experience unless you put something under it to start out with.

We contend then that the first essential to successful orcharding is a knowledge of nature's methods in the economy of plant life and of the conditions favorable to health, growth and fruitage, that we may assist nature by operating upon conditions when they are found to be at fault. The state undertakes to supply the needed information in so far as it is possible through that medium. We look to the Horticultural Society and the state experiment station as the most available and satisfactory sources of information. But again we hear the cry of book farmer. It comes from a respectable class of men, and it comes from Major Gasbag and his lieutenants, armed with ax and saw and a bucket of red paint. With hides inflated with egotism and experience they lead the van and many there be that follow. In their campaign against nature they have conquered on many a field and can do it again. These men of experience would compel a tree to grow to their notion regardless of its innate laws. If it looks sickly under treatment the dose was too light and they give it the kill or cure treatment. I would rather have one hundred George Washingtons with their little hatchets in my orchard than a band of these experienced horticulturists. No truce with nature is tolerated for theirs is the work of extermination and no prisoners are taken. The statistics show that only one tree in

ten planted is brought to successful fruitage; that tenth one must have been a wonderful tree. It was surely overlooked in the care of the orchard.

These tree surgeons differ somewhat in methods and you are perplexed to know which to follow. Thinking that in a multitude of council there is wisdom you listen to all, and between them and the tree vender from down east with his cull trees, new varieties worth a dollar each, you are honeyfugled on this hand and honeyfugled on that and in a few years you conclude that apple growing don't pay.

Mr. Reid.—“May I ask a question?”

Certainly.

What do you mean by honeyfugling a man?

I am glad you asked the question. It is always a pleasure to give information when we find an honest seeker. To honeyfugle a man is just the same as to hornswabble him; just the same in the horticultural sense—the two words are exact synonyms.

Mr. R.—“May I ask another question?”

You may.

What do you mean by hornswabbling?

Sir, I am glad to give further information. It gives me a chance to make myself fully understood. To honeyfugle or hornswabble a man is just the same as to bollywhack him; just the same. We trust this information will do good.

Another thing we have learned is that it does not pay to set any but a first-class tree. And we have learned, too, that it is next to impossible to get them from foreign nurseries. If men were as good judges of nursery stock as they are of cattle, it would ruin the tree vender's business utterly. I have seen many lots of apple trees shipped in and I have never seen but one lot that I considered first-class. Nor can you always get desirable trees from home nurseries, but you may do much better. The nursery and not the orchard is the place to make a tree. If a sickly, stunted, illy grown tree be planted its appearance may be improved, but it can never be made to pay for the use of the ground it occupies.

I regard the selection of trees of the utmost importance. Yet it seems to be an easy matter to sell and deliver the meanest kind of stock.

Men who are shrewd enough in other matters seem to know little of what a tree should be at time of setting. I have seen orders delivered in which there was not ten per cent worth setting. It is the practice of many nurseries to sell their good trees to good customers who are good judges, and through their agents all over the country work off their inferior stock. Many trees are sickly, stunted and lousy, but there seems to be a general belief that a tree will come out. This is an error most fatal to successful orchard growing. A poor calf is of some value, considerable value these days, but a poor tree is of no value whatever. Of all the swindles I know anything about the nursery may be, and some times is, the greatest.

It is not our purpose to make war on nurseries and tree dealers, for there are many honorable men among them doing a legitimate business, but in view of the fact that it is a question of but little time until we shall have imported into our state, through foreign nurseries, every form of pest known to the fruit industry, including San Jose scale, we believe it our duty to protest. We indorse the action taken by our state to quarantine against cattle affected with tuberculosis and see no reason why like measures should not be applied to protect us against pests destructive to the fruit industry. The introduction of tuberculosis would entail temporary loss, but the introduction of San Jose scale to any considerable extent would mean utter ruin to the most promising industry of our state. In this matter safety lies only in the most rigid adherence to protective measures. But to return.

In the selection of trees it should be borne in mind that the plant, like the animal, has its organs of prehension, circulation, digestion and respiration and that any serious disorder of the vital organs may be readily detected and is sufficient reason for ditching the trees so affected. The greatest care should be exercised at this point, and the want of such care is responsible for much disappointment.

After the trees have been selected, comes the planting, and this indeed is an important matter, but we must pass it with only a few observations on spacing and pruning at time of setting. Our reason for speaking of the spacing of trees is because of a wide-spread error held by many now in much favor, and since it is given out as advice by men of experience it is causing many to do an unwise thing.

We believe under ordinary conditions the most satisfactory distance is twenty-six to twenty-seven feet each way. A planting much in favor at this time is twenty feet apart north and south and thirty feet east and west. The reasons given for this spacing are that it gives the trees a better morning and evening sun, while each tree protects by shading the body of the one just north of it during the heated portion of the day. Both these supposed facts are mistaken. On June 21, when the sun has reached summer solstice, its northern declination is twenty-three and one-half degrees, our latitude is thirty-nine and one-half degrees, a difference of sixteen degrees. So that at noon on that date the angle made by the oblique rays of the sun with a perpendicular at our latitude is sixteen degrees, and the shadow cast by a tree is sixteen-fortieths the height of the tree. A tree then eighteen feet high would cast a shadow sixteen forty-fifths of eighteen feet, or six and four-fifths feet. A tree then must be fifty-four feet high for its noon shadow to reach the base of a tree twenty feet away. But you say, the heated season comes later, when noon shadows are longer. Very well; we will take another date. On August 5th (that's hot enough) the sun's declination is eleven and one-half degrees north and its rays strike us at an angle of twenty-eight degrees on that date at noon. A tree then casts a shadow twenty-eight forty-fifths of its height. A tree eighteen feet high would throw a shadow eleven and one-fifth feet, but the tree to be protected is twenty feet away. So there is nothing in the noon shade theory. This is a problem of trigonometry, but these figures are close, the error being against us. But how about the morning and evening sun. You are aware there are but two days in the year when the sun rises in the east and sets in the west, namely March 21 and September 21, when the sun is at the vernal and autumnal equinoxes, and we are not much interested where it rises on these dates. From March 21 to September 21 it rises north of east and sets north of west. The morning shade then falls to the southwest and the evening to the southeast and trees get the sun whatever the spacing. At 8:30, June 21, the sun is in the east and shadows fall to the west; the sun's rays then strike us at an angle of forty-five degrees and a tree will cast a shadow equal in length to the height of the tree. A tree must be twenty-seven feet high for its shadow to reach

the base of a tree twenty-seven feet away and then it rapidly shortens and shifts to the north. In view of these facts it is a matter of surprise that men of experience in orchard growing should advise planting twenty by thirty feet and assign the reasons above mentioned for so doing.

But what are the advantages in equal spacing both ways? It is obvious that in planting twenty by thirty there will be much interlacing of roots, and heavy demands made upon a portion of the soil while in the centers between the rows the wide way comparatively little feeding is done while the orchard is young; whereas with equal spacing the whole soil is available alike for the use of the trees. But a more important reason for equal spacing is found in the advantages of cultivation and care. The spacing we have suggested (twenty-six to twenty-seven feet), while it gives the number of trees per acre desired, is the most convenient. It is agreed that the orchard should be planted from three to five years in some tillable crop, as corn or potatoes. In the distances here given each tree space is exactly seven corn spaces. This enables us to mark out the ground one way with a three runner marker, going twice in each tree space, and plant with a two-horse planter, going three times to the space. The seventh row of corn standing exactly in the the tree row. You may plow the corn both ways, plowing six rows with ordinary cultivators, while the corn in the tree row may be worked out with a single horse. The cultivation of an orchard is a grievous task at the best and may be made much more so by an injudicious spacing of the trees. A mistake here will be repented many times in the years that follow. The proper number of trees to the acre, rightly distributed, the greatest possible convenience in culture and care, with all the advantages of sun and air that it is possible to secure, is what we claim for this spacing.

One other matter and we are through. In connection with setting the orchard comes the pruning. Very little should be done afterwards. but it is important that it should be done and properly done at the time of planting.

It is well known that the leaves are the lungs of the plant, that here the interchange of gases takes place, the plant exhaling oxygen and

taking on carbon. It is also known that the leaves are the stomachs of the plant, that all food taken up by the roots is carried here to be digested and prepared for use. Here also the surplus water of the sap is eliminated, and here the function of the root is the prehension of food and here the food supply is governed by the root supply. This being true the relation of the root and foliage is most important. If the tree has abundant root and scant foliage, digestion is incomplete, the plant fails to secure sufficient carbon from the air and retains too much water. This forced feeding causes the tree to send out numerous branches to increase the foliage, an effort of nature to correct the evil. It may become exceedingly brushy, but on the other hand if the tree has abundant foliage and light root, it has too much lung and stomach for the food received. The sap is now deprived of sufficient water and is too much thickened to be appropriated by the plant. The foliage becomes glazed, turns yellow, and it is evident plant starvation is pending. Now, if we are only mindful of the relation of root and foliage in the economy of plant life, either of the above difficulties may be remedied readily enough. When you observe forces feeding root pruning will correct it and hold in check brushy growth. If you see signs of starvation a clip of branches will lessen the demands of the tree to the capacity of the root supply. To make application of this principle in planting the branches should be clipped to correspond with the root clip caused by digging the tree. This can be properly done only when the functions of the root and foliage are understood and considered. In setting, when we find a tree has abundant root, we clip the branches but little. If the root be meager we give a heavy clip of branches.

After the orchard has been planted two or three years, if well rooted trees be set in good ground, you will find on some trees many limbs standing on the body and larger branches near the body. Some of these grow crosswise through the top and promise to become bad rubbers. What is to be done? You are aware that this unwanted growth is due to great vigor of root and forced feeding. You are also aware that if you remove these rubbers you clip a top already insufficient and run the risk of aggravating the forced feeding to the extent that

you may start a number of branches for each one taken off. It is evident that you should remove only the more serious offenders. A little deep plowing to break a few roots and hold up the forced feeding would be profitable for such a tree. So far as attempting to reform an ill shaped tree by heavy pruning, it would better not be done, unless disorder from insufficient root vigor is apparent. It will only make a bad matter worse. This abnormal condition of root and branch does not exist unless there has been some interference with the normal development of the plant. This interference may come through causes over which we have no control, but more commonly from injudicious use of the knife. We believe that quack surgery is the worst pest known to the fruit industry.

Recitation by Miss Cora Brantley.

Song.—Male Quartette.

SOME NEW ARKANSAS SEEDLING APPLES.

By Prof. J. T. Stinson, Fayetteville, Ark.

I have for several years been interested in the new seedling apples of northern Arkansas. Our country seems noted for originating new apples. There are several reasons for this. The soil and the climate are very favorable. In the early settlement of the country many seedling orchards were planted; as there were no nurseries then, and it was far from transportation lines by which to ship trees from older sections of the country. I have found and worked over one hundred new apples. The valuable ones you might count on your fingers, perhaps of one hand. The parentage of most of them is Ben Davis, Winesap, or Limbertwig. Among those of Ben Davis origin we found one called White Ben Davis. This was found in several orchards, with trees and fruit the same. When one man finds a good kind in his orchard his neighbors will get scions and graft them into their own orchards. So we often find the same new kind in several orchards.

I have here, for your inspection, a collection of fourteen varieties. I will be glad to tell you anything that I know of these apples; but it will take too much time to give the history and description of them all in detail. Their value for other sections is unknown, as they have not been tested outside of the locality of their origin. Some nurserymen are selling and recommending them for all sections of the country.

We hope to have them fairly tested in other states, and thus learn something of their value for general growing. Extensive planting of new varieties for profit is a mistake anywhere. Even in the land of their origin we find one variety grown only in a limited area. Some of them have many names. We have tried to have them known by their proper names and to get nurserymen to so designate them. We regret that some of them are selling these apples under new names of their own giving.

We grow these new varieties for the purpose of sending them out for trial, to test them in the nursery, and for our own planting. The question of the adaptability of these varieties is one in which most of you are interested.

Take the variety known as the Mammoth Black Twig, or Arkansas as we call it. It has, I believe, been sold and planted quite largely in Missouri and other states. Yet it is not known how it will succeed. So far as our experience goes it is a shy bearer for general commercial planting.

Arkansas Black has no value as a commercial apple. It is a shy bearer, and scabs worse than anything else we have.

Givens we consider one of the best of the collection and recommend it for general trial.

Collins (Champion or Collins Red) we think next in value to the Givens.

Oliver (Senator) has attracted much attention. It is of fine quality, a little later than the Jonathan, but too early for us. If it proves hardy and productive further north it may be very valuable.

Evans is sweet and a good keeper.

Beach (Apple of Commerce, Richardson Red) is another one which we hope will prove of good value.

Black Ben Davis, Etris and Arkansas Belle are from Washington Co., Ark. If you want trees you will be perfectly satisfied by buying Gano trees. They are practically the same.

Vocal Solo.—Mrs. Arthur Anderson.

TWELVE HARDY HERBACEOUS PLANTS.

By Prof. N. O. Booth, Agricultural College, Columbia, Mo.

The term hardy herbaceous plants includes all those hardy plants of the temperate regions which die back to the ground once a year.

The twelve plants which I have selected to speak about to-day are ornamental perennials exclusively.

The cultivation of hardy herbaceous ornamentals which were so prominent in all the old gardens seems to have been rather neglected of late years. The reasons for this neglect are numerous. The multiplication of greenhouses and the improvement of greenhouse cut flowers, supplying the market the whole year round, has crowded out the old flower garden as a place to secure choice blossoms; the use of bedding plants with their brilliant foliage has superseded them for yards and public grounds.

In part at least this has been the fault of the style and nature of the older ornamental plantings. In most old gardens the collections of perennials consisted of everything and anything planted in much the same manner in which they were selected, the whole effect being curious rather than beautiful. And this in a great degree is probably the cause of their decline in popular favor. However, the hardy ornamental perennial can ill be spared from either garden or yard and to-day there seems to be a reaction in favor of these neglected plants.

The advantages of hardy perennials as yard decorators are such as recommend them particularly to those people who have but little time to devote to flowers and who wish to secure the maximum amount of bloom with the minimum amount of attention and work. Concisely

stated the advantages of perennials are these: First, they are easily and cheaply procured; second, once secured they last a long time; third, they require but little cultivation. Starting early in spring with a root system already formed, to draw upon, they can keep abreast, if not in advance of the weeds, and hence require but little intervention to save them from these horticultural outlaws. Fourth, they are easily propagated by methods requiring no expert training.

The list of hardy herbaceous ornamentals which I present to you to-day could be duplicated many times over without exhausting the number of really desirable sorts for yard and garden cultivation. The native perennials of our woods and prairies are almost unknown in our gardens, although many possess great beauty and could undoubtedly be improved by selection.

The first plant which I shall call your attention to is that old-time favorite the Carnation or Pink. This flower is too well known to require any description—not the greenhouse form. It is one of the very few herbaceous plants which retains its leaves through the winter. The Carnation will grow in a great variety of soils, but it blooms best in a soil not too rich. It may be propagated by layers, cuttings or divisions, the easiest and most satisfactory where only a limited number are required being divisions. This should be done in the fall, as should all transplanting—the Carnation resenting disturbance in the spring. This plant is both desirable as a cut flower and as an outside decoration. The Carnation should be planted either singly or in rows where it will soon mat and form a clump as large as is desirable for good growth. The named varieties of the Carnation are not quite true from seed, but the seedlings nearly always possess merit and this method of propagation is very interesting. (*Dianthus barbatus*—Sweet William). (*D. Phunarius*—old Pink). (*D. Caryophyllus*—Carnation, Clover Pink, Picotee, Grenadine, etc.)

The next plant on the list is the Phlox. There are a great many species of this genus which are perennials, ranging from four inches to four feet in height, with red, violet or white summer and fall blossoms. The subulata type are low growing kinds, soon covering the ground—these are commonly known as Moss Pinks. The Phlox will grow best

in a rather heavy soil. They are best propagated by division of the crowns in early spring, or by root-cuttings made at the same time. The Phlox, like the Carnation, makes a fine cut flower although hardly as attractive, and certainly not as popular as the latter.

The third flower on my list is the Peony. This is one of the most popular of the ornamental perennials, both on account of its gorgeous red, white and purple flowers and its dark, rich foliage. The Peony is a strong feeder and should not be planted too close to other plants, for one or the other will suffer. The herbaceous Peony will do well in almost any location if the ground be kept rich. The Peony is not the cut flower that either of the preceeding is; its chief beauty lying in the blooming plant. It is best propagated by division in early spring. It can be well utilized as clumps in beds or borders furnishing a green background for lower growing plants.

The fourth plant to be considered is the Daisy (*Bellis*). This little plant, with its blooms from April to August, makes one of the prettiest of borders for a flower bed. The Daisy will stand crowding and will grow in almost any soil. In fact our native sorts show altogether too great a readiness to adapt themselves to varied conditions. Propagate by division after flowering is over. The cultivated Daisy is not quite hardy here, requiring a slight mulch through the winter.

The next plant on my list is the Aster. These plants, with their blue, white or purple fall flowers are a distinct addition to any garden. They are of easy culture, one to four feet high, and, like the Daisy, will stand crowding. Propagate by division in spring or fall.

We now come to one of the oldest inhabitants of our gardens, and where it succeeds well, one of the finest summerflowers—the Hollyhock. The colors of the Hollyhock are quite various: white, pink, red, yellow, and black red. The Hollyhock may be propagated by division of the crown after flowering or by cuttings later is probably the best. The Hollyhock is one of the most permanent bloomers, being very slow to fade.

The seventh flower on the list is the Iris or Flag (*I. Ibericus*, *I. Germanicus* and others). The Flag needs no description, its blade-

like leaves and its blue, yellow, purple, or white flowers are familiar to all. (May and June flowers.) There are two classes of the *Iris*, the division being based on the root formation; these are the bulbous and the rhizomatous. The most simple method of propagating the bulbous group is by offsets and the rhizomatous by division. The *Iris* will grow in a variety of soils but seems to do best in a light, rich loam. They will stand full exposure to the sun and should not be moved oftener than positively necessary. Bulbous *Irises* are most effective when massed.

The next flower to be considered is the *Lily*. A much longer paper than this could be written on the different species and varieties of *Lilies* without being of sufficient length to commence to do the subject justice. A great many species of the *Lily* are hardy in this section and are a very desirable addition to the ornamental grounds. The soil favorable to *Lilies* varies so much with different species that it is impossible to give any definite rules. However, most, if not all, *Lilies* will stand plenty of fertilizer, giving best results both in number and quality of blooms in a rich soil. The *Lily* is a bulbous plant and is propagated by offsets from the bulbs. The *Lily* prefers partial shade and protection from the wind. Divide or replant in autumn after the leaves have ripened off. Plant from four to six inches deep and mulch in the fall, the mulch serving the double purpose of protector in winter and a conservor of moisture during the growing season. The bulbs should not be left exposed to the air longer than is positively necessary, as they soon dry out, and are materially injured if not destroyed.

The next flower on our list is the hardy *Chrysanthemum* (*C. Sinense*) (var. *Pompon*). This is the small floral plant of the old gardens which is covered with blossoms in the fall. A rich soil will increase the number and size of these blooms. None of the *Chrysanthemums* are quite hardy and will require the protection of four or five inches of straw or litter through the winter. For propagating, divide the stool in early spring. During the growing season the *Chrysanthemum* requires a large quantity of water, although it will not stand a sour or waterlogged soil. Good loam, heavy rather than light, is desirable and it can't be too rich.

The Narcissus is the tenth flower considered. The numerous and very beautiful species of Narcissus are amongst our most popular spring flowers. A rather deep and somewhat stiff soil is preferred by these plants, but they are very tolerant of soil and location. If partially shaded by trees the blooms will retain their freshness for a longer period. These plants will stand massing and may be naturalized in the grass and will grow readily by the side of ponds and other water courses. They are propagated by offsets which should be removed and plants lifted if desired in August. The Narcissus, like the Lily, should be mulched in the fall,

The last two flowers on my list are natives of Missouri and the west generally. The first of these is the Evening Primrose (*Oenothera Missouriensis*). This plant grows all over the western states, particularly on the prairies. One of the finest floral effects I ever saw was produced by these flowers. It consisted of a ribbon of yellow stretching diagonally across a field indicating the course of an old abandoned road. The gorgeous yellow of the blossoms was toned down somewhat by the fading twilight, producing an indescribably beautiful landscape. Needless to say this floral exhibit was not appreciated by the owner of the field. These plants show best massed and are utterly useless as cut flowers. Propagate by seed or division in early spring. The Primrose prefers a rather light soil and will stand drouth and exposure to full sunlight. It blooms in July and August.

The last flower on my list is our common Spiderwort (*Tradescantia Virginica*). This plant with its dark blue blossoms is particularly desirable amongst the grass, where the contrast between the blue of the flowers and the green of the grass is very pleasing. The Spiderwort will grow in almost any soil or situation, but is especially well adapted to damp places.

This completes the list, and now before closing, I will say a few words about the planting and cultivation of this type of plants. First, in regard to the places to plant; flowerbeds should not be indulged in unless you have the time and inclination to look after them. A neglected, untended flower bed looks worse than no bed at all. Plant in the fence corners and the shrubbery borders where nothing else is

growing and the decoration thus added is that much pure gain. In planting carefully consider the general effect rather than the beauty of the individual plant. Mass those plants which will stand massing. Plant the lower, less conspicuous plants, in front with the more showy forms behind. Select your plants so so to have so far as possible a continuation of blooms throughout the season. If after a few years any of the plants show signs of declining vigor the chances are they have exhausted the ground around them and they should be raised, divided, if necessary, and replanted with new soil thrown around them. To the lover of flowers none will give so much satisfaction as these hardy herbaceous perennials.

FIFTH SESSION—10:00 A. M., Thursday, December 7.

After the call to order, the session was opened with prayer by the Rev. Mr. Gilliam.

The secretary read letters from U. S. Pomologist G. B. Brackett, regarding Missouri's display at Paris.

WASHINGTON, D. C., December 2, 1899.

Mr. L. A. Goodman, Secretary Missouri State Horticultural Society, Westport, Mo.

Dear Mr. Goodman:

Referring to yours of the 20th ulto. we are much pleased to learn of your success in securing apples for exhibition at Paris. While there are still some difficulties to overcome, we consider that the prospects for a successful exhibit in this line are excellent. The present plan is to transport the fruit in refrigeration from New York in February or March to Southampton, and transfer it from there by steamer to Havre where it will be placed in storage. From Havre it will be taken to Paris in small lots at frequent intervals as needed to keep up a continuous display as long as the fruit lasts, and it is believed that a sufficient quantity of durable fruit is in sight to maintain a full exhibit until midsummer, and to have apples of the year 1899 on exhibition in considerable quantity throughout the whole period of the exposition.

There are at present about 300 barrels of selected fruit in sight. There will of course be a considerable shrinkage when the fruit is re-

packed, as there is very general complaint that apples are not keeping as well as usual in consequence of the extreme heat in the past three months.

We feel sure that Missouri will show up well in this exhibit, and your society has our sincere thanks for the activity manifested in this work. It is our belief that their efforts will be reimbursed to Missouri fruit growers through the increase of foreign demand for their products in future.

I have already addressed a letter to you, suggesting that the society send a photograph of its membership if possible in addition to the exhibit in horticulture. All photographs should reach us by December 15th, if possible; in any event not later than December 31st.

Yours very truly,

G. B. BRACKETT,
Pomologist and Expert in Horticulture.

Washington, D. C., December 2, 1899.

Mr. L. A. Goodman, Secretary Missouri State Horticultural Society,
Westport, Mo.:

My Dear Sir.—In addition to the exhibits of American apples of the crop of 1899, now in storage for shipment to Paris, it is expected that opportunity will be offered for the exhibition of more perishable fruits of the crop of 1900 as they mature. The details of this feature of horticultural exhibit are not yet decided but it may be outlined in a general way as follows:

Exhibits of choice fruits that are likely to endure transportation to Paris, offered by individuals or societies, will be transported and installed free of charge under such restrictions as to quantity, time of shipment, etc., as may be found necessary.

Arrangements are contemplated by which shipments can be forwarded from New York in refrigeration, at intervals of ten days or two weeks after the middle of July, on a schedule which will be announced later.

If the fruit requires refrigeration from shipping point to New York, that will have to be looked after by the shipper, unless a car load should be offered from a single shipping district at one time. In such cases the commission will probably be willing to assume the entire cost.

As the making of a successful exhibit in this line depends largely upon the thoroughness of the preliminary arrangements it is important that those horticultural societies which contemplate showing their products should select their committees early and decide upon what fruits to exhibit. They should also determine as early as possible the

probable quantity and the approximate date when it will be ready for shipment so that the necessary arrangements for ocean transportation can be made.

In the case of winter apples and pears of the crop of 1900, of which it is expected that the exhibits will be large after September 1, if the crop is good, shipments can probably be arranged for from New York, by any of the regular steamers, as refrigeration will not be required.

If your society is interested in having your state represented, as above indicated, I would suggest that action be taken at your annual meeting with that end in view.

Your exhibits can in that case be arranged for in ample time and the necessary arrangements for their transportation and installation be completed. The general plan as outlined in circular 8, will be followed, though it is subject to such modification as occasion may require.

Trusting that your society may have a pleasant and profitable session at its coming annual meeting, I remain,

Yours very truly,

G. B. BRACKETT,

Pomologist and Expert in Horticulture.

PARIS EXPOSITION.

Secretary Goodman.—We now have something over eighty-five barrels of apples in cold storage in Kansas City for exhibit at the Paris exposition next year. These will be added to from the best on exhibition here now. The Armour Packing Company charge us nothing for keeping these apples.

J. T. Snodgrass.—Are apples too ripe now to put in cold storage?

Secretary Goodman.—I think not. It would seem that apples exhibited and handled several times would not keep. We have often kept them for the summer meeting and sometimes for another year. After an apple gets ripe and the skin contracts it is safe to keep it, even if it is ripe. The critical point is past now and this ripe fruit seen on the table here will keep all right, and I think we can hold them ready for the exhibit next spring.

REPORTS OF COUNTY SOCIETIES.

RANDOLPH COUNTY.

On December 17, 1898, "a few of the faithful" met at court house in Moberly, Missouri, and organized the Randolph county Horticultural Society and elected the following officers: B. R. Boucher, president; G. N. Ratliff, vice-president; J. W. Dorsey, treasurer; J. P. Sinnock, Geo. Gutmunst, and W. A. Rollins, executive committee; C. W. Halliburton, secretary.

Constitution recommended by State Secretary Goodman for county societies was adopted. The society meets first Saturday of each month. At the first meeting there were twenty-five persons enrolled their names as members, and the list has steadily grown and now contains about fifty members. We have not failed in the past year to hold our regular monthly meetings and have had a good attendance. We have, we are confident, awakened new interest in fruit culture in this county. We have encouraged those who were already engaged in fruit culture and at the same time have been the means of many others planting that never before planted a tree; and I am confident there has been more trees set out in this county the past two years than there were the past ten years prior to 1898. And right here it would be well to return thanks to the state society for holding their winter meeting here in 1897, for that gave us an "eye opener" and put us to studying.

The society made a fine exhibit at the Moberly street fair in September last. We had the largest booth on the street, fifty-four feet long and containing four hundred and eighty plates of fruit, besides many potted plants and evergreens. There were over two hundred entries. The society offered a very liberal premium list. All fruits furnished for exhibit were donated to the society and were auctioned off and brought a sum sufficient to pay all premium lists and all other small expenses which were incurred. The apple crop was about twenty-five per cent of a full crop and sold from \$1.25 to \$1.50 per eleven peck barrels for No. 1 and No. 2, and 90 cents per eleven peck barrels for culls. Peaches an entire failure.

Pears, very light crop, principally Keiffer; grapes, full crop but badly damaged by black rot.

Strawberries, one-half crop; sold from \$1.20 to \$2.00 per crate. Raspberries, light crop; sold from \$2.25 to \$2.75 per crate. Blackberries, light crop. Many vines killed past winter.

Eleven peck barrels were mentioned in this report, but the discussion showed that the barrels in use in the state are three bushel barrels, and that the Randolph county was probably in error in stating that the smaller barrel was used in his county.

Prof. H. C. Irish reported for the St. Louis county society. They have recently organized with fourteen charter members and a good outlook for increasing membership.

J. J. Kiser said he believed that Gentry county kept up its society, but as he lived in the extreme edge of the county he did not attend its meetings.

T. B. Chandler said that St. Francois county had a new society of forty-four members. Great interest is shown, though they have as yet no large commercial orchards.

G. T. Tippin gave a favorable report from the Greene county society. They have fifty members, with as much interest as at any time in the past.

Mr. G. W. Hopkins, so long secretary, has retired for a season's rest and Miss Emma Park holds that office.

Buchanan county was reported by Mr. Irvine of the "Western Fruit Grower" to be in a thriving condition. They tried to hold their monthly meetings the past summer. The first time it rained and they had no meeting. The next time it rained and the next, and the next. So the summer was past and no meeting held, but later they had a good meeting.

Mercer county was organized by President Murray two years ago, and continues to prosper and do good work. The society made arrangements with the county fair association to let the horticultural society have full charge of the fruit and vegetable exhibits. The families of members of the society having season tickets to the fair. The exhibits were good and the arrangement was so satisfactory that they will begin earlier next year. It was suggested that other societies might try

this plan. The Mercer county society expressed their appreciation of the state society holding its annual meeting at Princeton on their invitation.

Audrain county society was reported by Mr. Peyton as being alive yet, but not as active as they could wish. He thought that it would be well for the state society to come to Mexico next year, and that this would arouse them to work.

Adair county society was reported by J. E. May. He reported a lack of interest.

Boone county society was reported by D. A. Robnett as not showing much interest, though there are many persons in the county who are much interested in fruit growing. They had over one hundred members at one time, but had had no meeting for two years.

Livingston county society was reported to be in very good working condition with twenty active members. Several car loads of apples were shipped from the county this season. The strawberry crop was good; other fruits light crop.

Missouri Valley society was represented by J. C. Evans. It holds its summer meetings at the residences of the members, and the winter meetings at the club rooms of the Coates House hotel in Kansas City, the third Saturday in each month at 10 a. m. They have a good, large membership. He did not know the number. They are not a county society, but the members are from different counties in Missouri and Kansas.

Maj. Holsinger modestly claimed that the Missouri Valley society was the parent of the Missouri state society and also of the Kansas state society. The two state societies were languishing, more dead than alive, until several members of the Valley society went to their annual meetings and revived it.

Lincoln county reported sixteen members in their society, twelve of whom have paid their dues for 1900.

Officers: A. H. Kercheval, president, Ellsberry; B. C. Benedict, secretary and treasurer, Moscow Mills.

But few papers have been read, discussions predominate. We have had no display of fruits, etc., but hope to be able to make a small display next year.

The orchard interest is on the increase and many orchards will be planted in the near future.

HOLT, CLAY COUNTY, MISSOURI, July 30, 1899.

L. A. Goodman:

Dear Sir:—I do not think there is more than five per cent of a crop of winter apples in ten miles of this point; not enough to cut any figure in the market. Ben Davis is ahead, with Winesap and Missouri Pippin next. Fall apples a little better. Trees not hurt on good well drained land—not hurt by last winter's cold. On land not well drained, badly killed, and more so where not well air drained. No peaches, pears or cherries; but few plums.

Hardy grapes, good; strawberries half a crop; blackberries about the same. Raspberries but few. All kinds of fruit trees making fine growth. I find that from apple trees that have been well cultivated the apples are not falling near so bad as from trees not cultivated; neither is the codling moth near so bad. While there is quite a lot of yellow-necked caterpillars where my trees are not cultivated, there are none where well cultivated. I give good and thorough cultivation, clean up all trash under trees, burn or plow under early in spring, hoe up surface under trees. I think such treatment for a number of years will beat spraying as followed by most people. There has been but little spraying done in this locality and that has not been very satisfactory. I think I will be with you at Princeton this winter if health permits.

I am fraternally yours,

G. T. ODOR.

GLASGOW, HOWARD COUNTY, MO., July 23, 1899.

Mr. L. A. Goodman, Westport, Mo.:

Dear Sir:—I have just come in from a tour among my apple trees and I send you by mail a sample of three Winesaps and three Ben Davis. The bulk of my fruit is just like this with scarcely a perfect apple among 600 twelve-year-old trees. All bloomed full except Huntsman. Some trees of Ben Davis have a fair crop, but all knotty and scabby, but most of the scab is on the Winesap and Roman Beauty. Now what causes the black spot on the Ben Davis? Is this not the work of the plum gouger? This has been a hard year on my few strawberries, owing mostly to the hail storm about beginning of ripening and too much

rain. My blackberry crop from two and a half acres was about thirty cases, and a neighbor whom I sold the plants, all Snyder, got over one hundred cases from three-fourths of an acre. Mine were badly winter killed and can't explain why. My 250 to 300 pear I have deserted entirely. Everything blighted more or less. Bartlett, Seickel, Kieffer, Duchess and Garber. It is really discouraging and it seems as if fungus and other diseases and insects are going to overcome us. I did not do any spraying this year and doubt if it would have done any good, owing to so much rain. Even the onion I will have to stop growing on account of the onion thrip. They come about July 1 and stay till fall. I make quite a little out of the winter onions early in spring to sell with lettuce but the thrip just sucks them to death. I have tried Paris green and kerosene emulsion and am now trying Pyrethrum powder. Verily the way of the horticulturist is not strewn with roses.

I notice my peach trees I headed back when young growth began to show are far ahead of the early cut back, lost some of the latter.

H. SCHNELL.

JEFFERSON COUNTY,
Scheve, Mo.

L. A. Goodman, Esq., Westport, Mo.:

Dear Sir:—The horticultural reports have been received from your office. I am very thankful for these favors, as I am interested in the work the advancement of which your society is so earnestly and successfully advocating. I hope to be a member of your society before asking further favors from it. I regret that our county is so indifferent to the interests of horticulture. We are admirably situated here for fruit growing and certainly share in the reputation of southeast Missouri for the production of fine fruits. I have been raised on this farm; my father settled here in 1846 and planted his first orchard in 1850, some of the trees of which are yet bearing. I can truthfully say that no farm in this vicinity ever produced more value per acre one year with another than our orchards. Of recent years I have made fruit my specialty, and during the past three years from an apple orchard of 300 trees set out in 1887 have marketed good crops and have proved to my neighbors that even a small orchard is indispensable if we are to keep even, financially. My peaches have done well the past two years and at this time are in good condition. My produce is all hauled to St. Louis on wagon. I do my own selling. Apples usually to packers, peaches usually in a small or retail way; in 1895 I hauled 34 wagon loads of apples, selling at prices ranging from 27½ cents per bushel in September to \$1.20 in February, '96; this latter

for choice fruit by retail. The past year has been the worst from a financial standpoint of view that we have yet experienced. Pork, wool, horses and many other products have been low priced; the wheat crop was very nearly a failure and owing to previous dullness cattle and sheep had been neglected and become scarce; for these reasons the farmer who made fruit one of his side issues can not fail to appreciate its great value. I think I shall make an attempt to get the fruit growers of our county together and form a society. I hear men talk of planting trees who formerly ridiculed the business. I have an early apple here that is about to become obsolete. I think it is worthy of some attention. I have sent some scions of it to Messrs. Weber & Sons of St. Louis county who have promised to propagate it; it ripens earlier than the Early Harvest, is smaller but cooks well, and before the southern fruit began coming to our market was very profitable. Mr. M. Keuhne, a fruit dealer of South Broadway, St. Louis, has handled all of ours for 35 years. He urges me to keep it. With best wishes, I remain,

Yours, Etc.,

Yours, Etc.,

JOHN GEATLEY.

Brandsville, Howell county, Mo., August 3, 1899.

L. A. Goodman:

Dear Sir.—We have a small orchard, about 250 bearing trees, mostly Maiden's Blush and Ben Davis. Eighty per cent of the trees of all kinds are heavily loaded and until last Friday bid fair to make 90 or 95 per cent of a crop.

In the fore part of last week my neighbor, Dr. W. A. Pease, (Christy P. O.) consulted me about filling out your blank report on postal card. At that time I thought five per cent would cover dry knot or scabby apples. To-day one-half of our apples are about the color of ripe walnuts just fallen from the tree in the fall and I believe they will all rot as they did the past two years, which I attributed to drouth and heat. This year our drouth came early and lasted six weeks. During its existence the apples grew very little, but remained sound. The drouth was broken July 20 and it rained for three or four days and the apples started growing very fast and now seem to be one-half larger than when the rain fell. Other orchards are in same condition. To what to you attribute this condition? I should have said that during the drouth we had no excessive heat, but the temperature was pleasant, now it is very hot.

Very truly yours,

R. W. QUADE.

BARING, KNOX COUNTY, December 13, 1899.

Hon. L. A. Goodman:

Dear Sir.—I hope you had a good and interesting meeting at Princeton. Such meetings are very beneficial, not only to the town, and its surrounding population, but to all lovers and practical workers in all the different branches of horticulture. It must be a great deal of satisfaction to you and other members of our state horticultural society to have created enthusiasm and extended knowledge to all lovers of and workers in horticulture, and to keep alive the interest therein, as also to new beginners to steer clear of the serious mistakes made in the past, in setting out the wrong sorts for our soil and climate, and the usual slipshod ways in transplanting, all of which is no excuse now when the knowledge of our veterans is available. I am sorry that I have not got any apples to send you for exhibition purposes. I had about a half a crop of winter apples, mostly Ben Davis. They were only medium size and about the fore part of September we had a wind storm that blew fully one half off the trees, bruising the most of them. Over one-half of my grapes were destroyed by the black rot. We had a fair crop of pears, mostly Kieffer. We had a partial crop of plums, Wild Goose and Golden Beauty. I cut down all but two of my Marianna plum trees, one of them near the hen house, which tree bore fifteen gallons of nice plums, the only tree that ever did any good out of a dozen I had on my farm, the others always began rotting about the time the fruit began to color. I believe near a hen house is the place for plum trees. My Japan plum trees suffered greatly last winter, but we must try, try again, as their fruit is fine; besides we may not have just another such a winter in a generation. Our pear trees nearly all blighted, more or less, Keiffer as well as others. The first time blight struck my trees was a year ago, and this season about twice as bad as last year. I pruned and shortened back all affected limbs and the trees seem to have recovered, but some have some unnatural new sprouts which I will cut back to healthy wood, and I intend to spray my trees before growth begin with lime and sulphur as I see that recommended. Apples generally are not keeping well, over one-fourth were wormy and a large per cent had small holes gnawed in them before they were grown which work caused many to rot; some also have the bitter rot. My trees have made a good new growth, so perhaps next year we may have a good crop of fruit again. My trees show no sign of hurt from the last severe winter, with the exception of a few red Astrachan trees which had split but which I gave a thick coat of paint, and have nicely calloused over this summer and made fair growth and bore a crop of fruit. We had a long dry spell this fall but trees held their leaves until frost. It has been too dry for planting strawberries, but my patch has done well as I took extra care of it. With me the Clyde has proved the most promising of all new sorts I have tried recently. Lu-

cretia dewberries were killed to the ground last winter. By the way, a neighbor had a fine crop of grapes, no rot. He had them trellised about seven feet high. He believes that to be a security from rot. We had rain, hail, and snow on the eleventh inst. Have plenty of water now. I close with best wishes to you for a happy new year.

Truly yours,
PETER DAILING.

GENTRY COUNTY.

It is with regret that I write you after the meeting at Princeton. Not that I would have said anything new or given any new advice, but telling the old story over again something new is being brought out by some one every year.

It was my intention when I got your program this year to attend, as each one should take a personal interest as far as possible to develop their own interest, but business was such that I could not leave. Then I thought I would write and say what we were doing here, but neglected it until too late.

The fruit business seems to be on the decline, generally speaking, on account of the severe trials and short crops we have received for two years. But a few of us are still trying to hold up the banner until a reaction will take place.

The prospect is not great for planting this spring, but some will reset where trees froze and died last winter and summer.

On account of the drouth last summer the raspberries failed to give us many sprouts, but the canes seem to be in good shape for the spring. The same with other berries, except strawberries, which failed to put out many runners so a short crop is the sure result.

Respectfully,
G. E. ADAMS.
Darlington, Mo.

REPORT OF COMMITTEE ON NEW FRUITS.

Mr. President, Ladies and Gentlemen:—

Your committee on new fruits begs leave to report as follows:

Among the new fruits exhibited may be mentioned fourteen varieties of the Arkansas seedlings shown by Prof. J. T. Stinson, of Fayetteville, Ark. Of these, ten are comparatively little known in cultivation.

Black Ben Davis, Etris and Arkansas Belle are so much like Gano that the committee are not able to distinguish between them and the latter well known sort. We believe that Givens, Collins, Evans and Beach are worthy of trial to determine their commercial value, and that the others may be at least of interest in home and amateur plantings.

Nixonite, exhibited by Mr. M. Butterfield, Farmington, Mo., is a new sort that seems to us to have merit. It is large, resembling Huntsman in size and color, of good, sprightly flavor and firm texture. It is said to have been grown from seed which was brought from North Carolina fifty or sixty years ago, and planted at Hopewell, Mo., by Mr. Nixon.

Burk, shown by Mr. J. T. Snodgrass, West Plains, Mo., is a large, fine looking seedling, pale red over green or yellow ground and may be a valuable sort.

A new seedling exhibited by Mr. Nelson closely resembles Ben Davis in appearance, but if it is a better keeper, as described, it may have commercial merit.

Several other seedlings of less promise were shown.

Committee on new fruits:

L. H. CALLAWAY, Ill.

R. A. EMERSON, Neb.

J. C. WHITTEN, Chairman, Mo.

REPORT OF COMMITTEE ON NOMENCLATURE.

At a meeting of fruit growers held at Salem, Mo., in December, 1898, the matter of the identity of certain varieties of apples was discussed at length, and failing to reach a satisfactory conclusion, a committee was appointed with instructions to make further investigation and report at some future meeting of this society. As a member of that committee and as a member of your committee on nomenclature, it is fit perhaps that a report be made at this time.

Your committee find near West Plains, in Howell county, a large light yellow apple which is known to be a seedling of that locality. It is called Thomas. It has been little disseminated.

Your committee find in the neighborhood of Salem, in Dent county, an apple similar in all respects, only that the trees are large and evidently as old or older than Thomas. We would feel justified in pronouncing it the same.

In the neighborhood of Lebanon, in Laclede county, Mr. Nelson has called attention to one very similar, but the committee do not hesitate to call it Robinson Pippin.

In Texas county another one of the same class is found that your committee are of the opinion is Shannon or old Ohio Pippin.

J. C. EVANS.

REPORT OF COMMITTEE ON FRUIT.

We, your committee would beg to report the following:

Hartzell, C., St. Joe.....	\$ 5 00
Robnett, D. A., Columbia.....	10 00
Tippin, G. T., Springfield.....	2 50
Nelson, A., Lebanon.....	10 00
Snodgrass, J. T., West Plains.....	12 00
Butterfield, M., Farmington.....	20 00
Gano, G. W., Parkville.....	4 00
Wyman, H. R., Princeton.....	12 00
Mayes, J. E., Wilson.....	4 50
Linton, S. H., Marceline.....	3 00
Summerville, O. B., Topsy.....	1 00
Ciodfelder, Modena.....	1 00
McDonald, Philip, Princeton.....	1 50
Davis, A. J., Jefferson City.....	1 00
Callaway Co.—J. H. Marion, Fulton.....	7 50
	<hr/> \$94 00

Your committee find two plates of persimmons that are worthy of mention, also ten plates of Ben Davis shown by Prof. J. F. Stanley, of Cainesville. We also find on the table a fine contribution of California fruit prepared by a process unknown to your committee. The collection of apples are quite phenomenal in a season like the past. We supposed there was little or no fruit in the state, but the collection here shown is to us remarkable. The apples are fine, of high color and it would be hard to beat the show here made.

We wish also to make commendatory mention of fourteen new seedlings exhibited by Prof. J. T. Stinson, from the Arkansas Experiment Station.

Missouri has maintained her character as a great fruit state, being able to make such a showing in an off year.

Very respectfully,

FRANK HOLSINGER, Rosedale, Kan.

EMIL J. BAXTER, Nauvoo, Ill.

JOHN T. STINSON, Fayetteville, Ark.

Prof. J. T. Stinson, of the Arkansas Experiment Station, Fayetteville, was nominated and unanimously elected a honorary member of the Missouri State Horticultural Society.

J. T. Stinson.—I thank you for this honor. I do not deserve it, but I never received anything for which I was more thankful.

REPORT ON SMALL FRUITS.

By G. W. Hopkins, Springfield, Mo.

STRAWBERRIES.

I have been growing strawberries for twenty-eight years, but the past season is the worst I have ever experienced. After the fruiting season was over there was but little rain during the rest of the summer. Only occasional showers and even these were local and often confined to a small area of territory.

Those who went to work as soon as the berries were gone, cleaned out the old patches and kept up a continuous cultivation have a fair prospect for berries. Some cut down their patches to a very narrow width in the rows. The drouth prevented the formation of many new runners, consequently the berries will have to be grown on the old plants, which all berry growers know is not so good.

Many growers failed to work out their vines until the ground became so hard they could not, and they remained that way during the entire season. Of course these patches will be comparatively worthless and might as well be ploughed up. The vines set in the spring have made but a few runners, and they of feeble growth, and had it not been

for the timely fall rains they mostly would have perished. Many plowed up their old patches and are depending entirely on their spring setting for a crop.

I do not believe that in Greene county, that even the best prospects can possibly make more than one-half crop of berries. There are many patches that will not make more than one-fourth crop, and some that will not be worth picking.

The raspberry, where properly taken care of, is generally in good condition. The canes have made a fine growth, but there are scarcely any tips. Since the destruction of the older varieties by anthracnose there have been but few raspberries planted in this locality. There have not been enough raspberries raised in Greene county the past two years to supply the home market in Springfield.

All varieties of blackberries are in good shape. There has not been an unusual growth of wood, but sufficient for a good crop.

Gooseberries and currants are only grown here in a small way, mostly in gardens, and cut no figure in the general fruit productions of the country. So far as my observation has extended they are in good condition.

REPORT ON COLLECTING FRUIT FOR THE PARIS EXPOSITION.

By W. G. Gano, Parkville.

To the Missouri State Horticultural Society:—

Having been appointed by the executive board of this society to solicit, encourage and assist the fruit growers of the state to get together an exhibit of fruit for the state at the Paris Exposition for 1900, I submit the following brief notes:

By the generosity of the Frisco and Memphis railroad lines, which furnished me free transportation, my work was taken up in southern Missouri along those two railroad lines. Leaving Kansas City September 25th, I went to Salem, Dent county, over the Frisco line. At this point I found quite a lively competition in the apple traffic. There being some four different firms buying and shipping apples, and it was estimated there would be from forty to sixty cars shipped from this point.

It was very interesting and astonishing to me to find, not only at this point, but at all stations along the two lines of railroad, the long distances that men would haul their fruit to market. It was no uncommon thing to find fruit most any day that had been hauled twenty-five, thirty, and some times as far as forty miles, and delivered in fine condition. In other cases, where men had but a short distance to haul their fruit and every opportunity was favorable for them to obtain the best market price, they brought their fruit to market in a worthless condition, owing to a lack of a little horticultural education in handling. I have seen fine, large Willowtwigs that had been shaken from the trees on to the hard, stony ground and then hauled carefully to market on a spring wagon. I have also seen fine Yorks carefully hand picked in half-bushel baskets and then poured into two-bushel sacks, letting the apples drop the full length of sack, then settled down and handled as so much corn, and taken to market expecting the fruit dealer to buy them, and when the fruit is refused or they do not receive the price they expected, they then put the blame of the careless and rough handling to their wife, or poor little children.

This has been one of the years that the commercial orchardist or fruit grower was not in it, for in all points visited, the large orchards had scarcely any apples and the greater portion of the fruit marketed this year came from orchards of less than a thousand trees; consequently the apple buyer was forced to look to the small orchards for his supply of fruit.

Surely the lessons learned this year by the fruit dealer has been very dear to him and his disappointments very bitter; owing to the imperfect condition of fruit, the many worthless varieties, the rough handling before being received, and the long continued hot weather during the handling season, all of which has been very much against his success.

After ten days of hard work at Salem, having to visit very many orchards, in some of which I scarcely could find a perfect specimen, I procured ten barrels of fruit. Judge Woodside furnished one barrel of York and Ingram; O. S. Roush one barrel of Ingram and Ben Davis; P. Weller one barrel of Ben Davis and Ingram. The other seven barrels were bought from different individuals, each having their

card, giving name, address, quantity and variety attached with fruit.

From Salem I returned to Springfield and then west to the bordering counties, but did not find the fruit as good as in Dent county.

At Purdy, Barry county, some had been shipped out in bulk to evaporators at other points, but none had been barreled and shipped as commercial fruit, owing to the imperfect condition. At this point I procured one barrel of Ingram from T. H. Robberson.

I then worked back to Lawrence county. At Marionville I found the finest fruit in all my trip. This was in an orchard of W. T. Flournoy of some 600 trees of Ben Davis, Huntsman, Ingram and Winesap, which were all exceptionally fine. This orchard is about twelve years from planting, and this the fifth crop, picking about three barrels per tree, of very choice, perfect fruit, and were sold at \$2.00 per barrel measure, the purchaser furnishing the barrels and doing his own packing. On October 15th, when I was at this orchard, it was then unpicked owing to the vigorous growth and heavy foliage, which was then still retained. While all other orchards visited had then dropped their foliage while this orchard was unpicked on account of fruit lacking proper color. This orchard has had the most thorough cultivation, not only for this year, but every year, and sprayed six times each season for five years. Mr. Flournoy has also 140 acres of young orchard which is in fine condition, very much superior to anything I saw, and I was very favorably impressed with his mode of orchard treatment. His Rome Beauty trees were in splendid condition from all appearance, while this variety was in a very sickly and dying condition in all other orchards that I visited, being injured by the winter and by the severe drouth of the summer more than any other variety. In orchards adjoining Mr. Flournoy's the same condition existed as in other localities, a sickly, declining condition, while his had made a very vigorous, healthy growth, and trees still retaining their foliage. This condition can only be attributed to his culture and care of his orchards. Mr. Flournoy furnished three barrels for the exhibit—one barrel of Ben Davis, one barrel of Winesap, one barrel of Ingram—all of which were very fine.

I was very sorry after visiting other points that I had not remained here longer and purchased more for the exhibit, but being

anxious to visit other localities, I went to West Plains, Howell county, over the Memphis line. At this point I found some good fruit from young orchards, but in the older orchards the bitter rot had swept the fruit, not only at West Plains, but had been very destructive in the extreme southern portion of the state, appearing to be more destructive on the southern slope of the Ozark range, and the fruit buyer had turned his back on the sections where this dreaded disease, the bitter rot, prevailed to such an extent. Also the root rot causing the trees to die out at an alarming extent, which is very discouraging indeed to the fruit growers, as there are more and larger commercial orchards in this locality than any other in the state, but like other localities visited, the commercial orchards of any large extent were very unprofitable.

Here is certainly a very important field for our experiment stations to do some very vigorous and important work, which should be taken up immediately. As I remarked at the farmers' institute meeting at Mountain Grove, which was: If these two great calamities, the bitter rot of our fruit, the root rot of our trees, can be exterminated or prevented or even lessened it means hundreds of thousands of dollars to the state of Missouri. In south Missouri I think those two diseases are to be dreaded more than all other diseases or hindrances combined, for with these the fruit grower is at sea without rudder or sail.

At West Plains I procured thirty-five barrels, principally Ben Davis. Mr. A. J. Gardener, of the Gardener Fruit Farm, furnished two barrels, one of York and one of Clayton, which were fine. G. L. Sessen one box of Mammoth Black Twig; Theodore Boss one box of varieties. The remainder were purchased and credit cards attached.

At Mountain Grove, Wright county, I procured one-half peck of Ben Davis from W. J. Bailey, as the crop had been about all shipped out before arriving there. There had been nearly forty cars shipped from this point.

At Seymour, Webster county, I procured three barrels—one barrel of varieties from Webster County Horticultural Society; one box of Ben Davis from W. J. Nelson and two barrels purchased.

All this fruit, each specimen, was double wrapped, first in tissue paper then in a hard parchment paper which was furnished by the

agricultural department at Washington, together with cards which were put with each individual's fruit, giving the catalogue number and package number and variety and quantity furnished, by giving name, postoffice, county, and state, which was placed with each individual's fruit that was collected. This fruit was carefully packed in barrels, and when filled, before heading, each barrel was cushioned to prevent bruising in heading and shipped immediately to Armour's cold storage in Kansas City, which is being held by them until wanted to export, free of charge.

The state has already collected for this exhibit about seventy-five barrels, which is all held in cold storage by Armour Packing Co.

In conclusion, the varieties of apples which appear to have behaved best in all localities visited were York, Clayton and Ingram. The variety that appeared to be injured the worst by the winter and drouth this summer was Rome Beauty. I was out on this work six weeks, arriving back in Kansas City the sixth day of November.

STATEMENT OF MONEYS RECEIVED AND EXPENDED

BY J. F. DAVIDSON, TREASURER HORTICULTURAL COMMITTEE OF MISSOURI
COMMISSIONERS OF OMAHA EXPOSITION.

Received May 26, 1898, cash from state commission.....	\$2,305 78	
" " G. A. Atwood, collections.....	271 00	
		\$2,476 78
Disbursements:		
Tables, shelving, decoration and signs	\$ 197 00	
Express, freight, drayage and delivery.....	616 99	
Fruit packages, gathering, etc.....	429 12	
A. T. Nelson, superintendent, and extra help.....	443 35	
G. A. Atwood, president.....	261 40	
Stationery, telegrams and postage.....	28 29	
N. F. Murray.....	49 10	
J. C. Evans and John Evans.....	90 00	
L. A. Goodman, secretary.....	80 90	
A. Nelson.....	87 55	
J. F. Davidson, treasurer.....	71 78	
Ward Atwood.....	52 00	
J. C. Whitten.....	26 30	
F. M. Sterrett, December 28, 1898, balance.....	43 00	
Total	\$2,476 78	

J. F. DAVIDSON IN ACCOUNT WITH HORTICULTURAL COMMITTEE OF MISSOURI COMMISSIONERS OMAHA EXPOSITION.

May 20, 1898, To checks, F. M. Marshall, treasurer	\$2,205 78	
Oct. 11, 1898, To checks, G. A. Atwood, collections	271 00	\$ 2,476.78

Check No.	Voucher No.	Contra, Payee.	Amount.	Remarks.
1	2	G. A. Atwood.	\$ 155 00	For tables and shelving.....
2	1	G. A. Atwood.	98 00	16 barrels of apples.....
3	3	Babb.	18 36	Freight on jars of fruit.....
4	82	G. A. Atwood.	70 00	Express, etc.....
5	83	A. T. Nelson.	80 00	Salary for June.....
6	84	A. T. Nelson.	80 00	Salary for July.....
7	85	G. A. Atwood.	70 00	Express and expenses.....
8	86	A. T. Nelson.	80 00	Salary for August.....
9	87	G. A. Atwood.	150 00	Express, freight and fruit.....
10	89	A. T. Nelson.	80 00	Salary for September.....
11	88 & 90	G. A. Atwood.	100 00	Exhibit and expenses.....
12	91	N. F. Murray.	11 00	Fruit.....
13	4	G. A. Atwood.	321 75	Expense account, fruit and money.....
14	13	Consolidated Express Co.	16 10	Express.....
15	12	American Dis. Tel. Co.	71 78	Express.....
16	14	State Horticultural Society.	323 70	Advanced for printing and fruit.....
17	8	Sandusky & Co.	38 25	11 barrels apples.....
18	10	J. T. Snodgrass.	8 25	3 barrels apples.....
19	7	A. Nelson.	53 00	23 days at Omaha.....
20	5	J. T. Davidson.	36 60	7 days at Omaha and fare.....
21	4	G. A. Atwood.	10 00	Error in No. 4.....
22	15	Ward O. Atwood.	52 00	26 days at Omaha.....
23	92	H. Guehl.	15 00	Fruit.....
24	16	A. T. Nelson.	123 35	1 month, 3 days services and money advanced.....
25	17	J. C. Evans & Son	90 00	19 days services, J. C. Evans; 21 days services, John Evans.....
26	19	J. C. Whitten.	26 30	Railroad fare and 8 days.....
27	21	M. H. Bliss.	21 35	Rent on 1,800 plates.....
28	22	L. A. Goodman.	80 90	26 days, cash and expenses.....
29	18	American Dis. Tel. Co.	64 00	Express.....
184 & 30	11	Fairham	5 00	1 barrel fruit.....
31	93	J. F. Davidson.	25 50	Railroad fare and expenses at Omaha.....
32	94	The Express Transfer Co.	8 80	Express.....
33	23	N. F. Murray.	16 10	Fruit bought.....
34	24	W. F. Crofton.	6 00	1 barrel apples.....
35	96	G. A. Atwood.	20 50	Expenses, postage, etc.....
36	20	F. A. Rinehart.	4 50	Photos.....
37	97	F. M. Sterrett.	18 00	Cash turned back.....
38	98	F. M. Sterrett.	25 00	Cash turned back.....
39	99	J. F. Davidson.	9 68	Expenses to Kansas City and Springfield to make final settlement.....
Total.....			\$2,476 78	

SECRETARY'S REPORT.

It seems as if it could not have been a year since I last reported to you at Columbia. At that time the outlook seemed bright and it was hoped that the series of disastrous years had come to an end and better times were coming. In February all these hopes and plans and prospects were frozen by the Arctic winter and we have been more or less

crippled as a result. Some trees have had their fingers and toes frosted, others their limbs frozen, others their faces injured and still others have been unable to walk since, while a few have been frozen to death.

An uncommon series of disastrous years surely we have had to encounter, have we not? This wave of depression and discouragement we feel sure has reached its lowest limit and the wave will surely rise to the crest once more like the general business and affairs of the country have done.

The prospects for an apple crop, so bright in June, were blasted before the summer was past. The drouth of 1897, the extreme wet of 1898, the Arctic freeze of February, 1899, the superabundance of the insect crop and the fungus diseases, all conspired to destroy the apple crop, and succeeded beyond our most humble expectations.

Many of our orchards are in a precarious condition as a result of all these distressing circumstances and unless they have extraordinary care or extreme good fortune, I fear we shall see them dying for the next few years. In the southern part of the state the three great foes of the apple grower are the woolly aphis, the root rot and the root knot, at the roots of the trees; and the three foes to the fruit are black rot, apple scab, and codling moth; while the worst enemies to the tree and branches are the leaf roller, the skeletonizer, and the twig blight—nine big enemies to fight and fight continually or failure will be our portion.

The injury by the winter freeze has been the worst for thirty years. Many thousands of trees were killed, other thousands so badly injured that they will never recover or at best linger for a few years. Peach and pear trees that were not too badly injured and were properly pruned back have made a fine growth. The instructions given last spring to prune back severely, perhaps were misconstrued by many in the use of the term "dehorn." This dehorning as understood, by all who have practiced it during the last ten or fifteen years, means to cut back all of one or two, or at most three years' growth, and good results will always follow.

Many have made the fatal blunder of cutting trees to the ground. Many others have made the next, almost as fatal, mistake by cutting back into five or six or ten year wood, leaving practically stump of tree with branches only one or two feet long. While this severe pruning will

not prove death to the trees if they are in a healthy condition, yet it will prove their death if trees are as badly injured as last winter, and herein was the great mistake made.

The work of the society, since last we met at Peirce City, has been in the line of assistance to all our apple growers in giving them information about the apple crop and helping to secure buyers in the many localities of our state. Buyers have been plenty, evaporators have been at work the whole of the season. Prices have ranged from thirty cents to seventy-five cents per bushel for the apples alone, that would grade No. 1 or No. 2, while the culls sold from ten cents to thirty cents per bushel to the evaporators. These prices were certainly far beyond the value of apples in the condition they were at gathering time. Buyers certainly overreached themselves in the prices on the quality of the fruit on the market. The growers, once again, have had by far the best of the bargain in the apple crop this year. It is to be hoped that the result will not prove as disastrous to the buyers as it now seems, for it would be a misfortune to every fruit grower to have the apple buyers lose money on their purchases, for we will be sure to feel the results next year. The following clipping taken from a trade paper shows the serious loss they have sustained:

THE LOSS ON APPLES.

From the Fruitman's Guide.

"Not in the last ten years has the apple situation been so complicated nor the loss so heavy. From South Water street comes the wail that the Chicago commission men are \$200,000 "in the hole" on apples; around Washington street the rumor is going around and gaining volume at every revolution that the apple men here are \$250,000 on the wrong side of the ledger, and it is alleged that the three weeks of exceptionally hot weather in October which "cooked" many consignments so badly that even cold storage could not save them from decay has cost the apple men of the United States over \$1,000,000. Be this as it may—for a million dollars is a big sum—it is certain that the apple situation is a "parlous" one, and no turn is to be hoped for until the long deferred cold weather comes and comes in the shape of a hard

frost, which will freeze everything solid. And there can be no manner of doubt, unfortunately, but what the big men in the apple deal will see a lot more of their good money go playing ducks and drakes after the bad before the tide begins to turn and they start to make up on their losses. It is not too much to say that the majority of the apple men will have reason to bless their lucky stars if at the end of the season they are able to say, "We have worked for nothing, but it might have been worse." It certainly is bad enough to get but your labor for your pains, but it is certainly worse to have both labor and loss too. As for those farmers who, in hopes of a brace in the market, are holding out for higher prices, they are playing with fire and are more than apt to get badly burned. The fruit is rotting freely and it is a far cry to a healthy and high-priced movement of good stock from first hands."

Another part of our work was taken up after the consultation of the executive committee by mail, and the solicitation of the U. S. Pomologist, G. B. Brackett, and the western commissioner, H. M. Dunlap, of Savoy, Ill., and that was the collection of some apples for the Paris Exposition. By action of the executive committee W. G. Gano, of Parkville, was chosen to travel over the state to collect and pack apples for this exposition. He started on this trip September 25th and finished his work November 5th, just six weeks in the orchards. First, the arrangements were made with the Armour Packing Co. cold storage to take these apples and hold them free of charge until called for by the United States commission. This they have kindly done and they deserve a word of commendation for their liberality. Next was to get the railroads to give our worker transportation over their lines for this purpose. This was done by the St. Louis and San Francisco and the Kansas City, Springfield and Memphis railroads. The greater part of the apples came from southern Missouri and even among their best orchards it was hard to find just such fruit as we wanted. This report has been made more fully by Mr. Gano himself.

The study of the tree diseases and the insect pest have had close attention this year by many of our fruit growers, and our teachers at the experiment station.

A series of experiments were begun by Prof. Whitten on the root rot in south Missouri with the use of blue vitrol, lime and salt in many

varying combinations and amounts, singly, alone, one and two, and one, two and three. Practical applications will help to solve the question some time. The United States department has put another specialist to the study of this fungus, H. von Schrenk, of Washington University, St. Louis. He has been with me down in the Ozarks to collect material for this purpose and it is to be hoped that some good results may be obtained.

I wish again to call your attention to the Pan-American Exposition at Buffalo in 1901 and the necessity for this society to take hold of some plan for further opening a market for our fruits. I believe that there is no one thing which has effected such rapid development of our fruit interests and the bringing of such grand, good markets to our very doors as has just this one thing of fruit shows at these great expositions. Missouri will have to do her part in them all.

Again, in 1903 at St. Louis will be the great Western Exposition and here again we will have to take our work fully in hand. Missouri must not be behind her sisters in this either. But she will be looked upon as leader in this one at least.

OUR REPORT.

Since our last meeting the report for 1898 has been sent out and, like its predecessors, it has made a name for itself. To-day calls come from far and near, home and abroad fruit growers, and prospective ones, the new settler and those wanting to come to Missouri. You are the ones who make these reports so valuable by your knowledge, your experience, your theories, your papers, your discussions. It is because we have such goodly number of men who are practical in their work and know how to tell it to others so that they may profit by it. You have made this report chock full of suggestions, ideas, practical applications, new plans, and experiences and every one who reads it can not help but find something to his advantage and assistance.

The Shaw School of Botany is taking up the matter of diseases, and is becoming interested in the fruits of our state. We are glad indeed to welcome her to the open field of investigation and sincerely hope that the unlimited means at her command will be used to help

solve some of these most serious questions of the day. The young man, Earnest Field, appointed to a scholarship there last spring, left the position, and one suggested by Prof. Irish was nominated to the position, and received the appointment. His name is Robt. Meyer.

The School of Horticulture at our University is still before us for encouragement and help. Although the students are few, yet it is doing much for the young men who are concerned in the investigation, development and practical application of this science to the interests of horticulture in all parts of our domain. This school has engaged the attention of many of our teachers in the public schools and in this way the interests are spreading rapidly. We can already count by the hundreds the teachers who are taking up this in their school work.

This School of Horticulture should have the hearty support of every person who wants to see our state prosper in its every advantage. The young men of the state can make no mistake in taking any one of the course outlined at Columbia.

Our sister state societies are always, and we hope always will be, coworkers in this common cause of the upbuilding of horticulture. We gladly reciprocate and fraternize with them all, and find this means of securing information and facts one of the best we have. We always gladly welcome comers from all our societies and find them of great assistance in the discussion of all the important features of horticulture. Together the state societies of Illinois, Iowa, Kansas, Arkansas and Missouri should be a power wielding for good of the horticulturists.

The meeting of the American Pomological Society at Philadelphia last September was a notable gathering of nearly all the fruit growing states of the union. Among all these state organizations we were glad to find that Missouri was among those at the top. The advantages of Missouri, the energy of her fruit men, the wonderful development of the orcharding of the west, were acknowledged by very many at this meeting. Many valuable papers and addresses were presented and many practical ideas were given. One, especially, by Mr. Hale, of Georgia, concerning his large peach orchards in that state. It seems that the injury to their peach trees was as severe as the worst of ours. In many cases the bark was bursted, and just what to do, was their

question. His experience was a notable one. He pruned the trees back much more severely than usual and then gave them a top dressing of fertilizer. He then gave them very thorough cultivation and as a result secured a very good growth indeed, even where one-half of the tree was dead.

A more extended report of the meeting will be embodied in our next annual in a separate article, and Mr. J. C. Evans will also make a report for you.

The new experiment station and its work is a topic that demands our careful attention and consideration. The location is made at Mt. Grove. The trustees are appointed and are beginning their work and it is for this society to assist in every way the proper direction of the experiments in a practical line and help solve the difficult questions daily presenting themselves. The man to take this work should be one experienced in the Ozark region, a scientist capable of doing all the investigation necessary and yet practical enough to apply it to use.

INDIVIDUALITY OF OUR TREES.

As in each person so is there individuality in our trees. You, all of you, have noticed this in some special tree or trees in our orchards and why should we not make use of just this in every day work, and in all of our propagation of trees. Something can be done in selection of these individual trees, can there not? For one reason and another either of better selection or better surroundings, or better feeding, or better cultivation, or better location, or better soil, or better subsoil, some individual trees have far outreached their neighbors in hardiness, in vigor, in productiveness, and these qualities can be propagated, can they not? If so, why then not use this fact in each succeeding generation of trees. If this should be continued for forty years, having in mind this individual ideal tree, can you tell me what the result will be?

"Canst thou prophesy, little tree,
What the glory of thy boughs shall be?"

But I must not follow this further and only bring to mind this important feature of selection and individuality.

IMPROVEMENT BY SEEDLINGS.

This breeding of our trees is one thing still more important than selection because it is the foundation of things. Selection of only the best seed from the very best fruit in color, size, and shape, and the most perfect apples taken from the best, and most hardy and productive and most vigorous trees would give us a foundation to work upon, would it not? Let this be followed for a term of forty years and can you doubt what the result will be? Follow this by grafting from the trees outlined a moment ago and still greater will be the results. The farther step, the deeper foundation, the real fact of breeding for these new apples, would give us still the hardest step in this important development. But I can only call attention to these facts.

Continuing our work along the same lines as we have been doing, results will be sure in the future as in the past. All it wants, dear friends, is unity of action, unity in thought, unity in sentiment, unity in purpose and the results will take care of us and the state interests.

Respectfully,

L. A. GOODMAN, Secretary.

REPORT OF TREASURER A. NELSON.

December 8, 1899.

Balance on hand at close of June meeting.....	\$ 14 95	
Received from State Auditor, June 26.....	899 89	
Received from State Auditor, September 16.....	814 39	
Received from State Auditor, December 7.....	587 02	
Membership by L. A. Goodman.....	8 00	
Membership by A. Nelson.....	23 00	
		\$ 2,347 25

AMOUNT PAID OUT.

June 26	Express.....	\$ 1 80	
	P. O. Bill.....	6 00	
	Salary secretary, June, \$66.66, typewriter \$20.00.....	86 66	
	Plating medals.....	11 00	
	Warrant No. 432.....		\$ 105 26
July 26	Express.....	\$ 5 40	
	Cloth \$2.00, photos \$2.00.....	4 00	
	Postal cards.....	6 50	
	P. O. Bill.....	13 00	
	Engraving 48 medals.....	27 00	
	100 mailing tubes for diplomas.....	2 00	
	P. O. Bill.....	14 23	
	Salary of secretary for July \$66.66, typewriter \$20.00.....	86 66	
	Warrant No. 433.....		\$ 158 79
Sept. 16	Express 96c, \$1.06, 40c.....	\$ 2 42	
	Printing crop report.....	4 00	
	Five medals and engraving.....	17 50	
	P. O. Bill.....	30 53	
	Salary of secretary, August, \$66.66, typewriter \$20.00.....	86 66	
	Warrant No. 434.....		\$ 141 11
Sept. 30	N. F. Murray, trip to DeKalb, Mo.....	\$ 6 75	
	N. F. Murray, trip to Princeton.....	9 80	
	J. C. Evans, trip to Princeton and Platte City.....	13 39	
	J. C. Evans, trip to American Pomological Society, Philadelphia.....	63 85	
	Warrant No. 435.....		\$ 93 79
Sept. 30	P. O. Bill.....	\$ 21 02	
	L. A. Goodman, trip to American Pomological Society, Philadelphia.....	64 35	
	Express \$1.21, Scotford, printing, \$4.25, \$7.50, \$3.50.....	16 46	
	Salary of secretary, September, \$66.66, typewriter \$20.00.....	86 66	
	Warrant No. 436.....		\$ 188 56
Oct. 24	D. A. Robnett, trip to Omaha and 5 days.....	\$ 10 00	
	D. A. Robnett, trip to Jefferson City, 8 days.....	8 75	
	Express 65c, \$1.80, 96c, 35c, 35c, 30c, 35c, 60c.....	5 36	
	Telegrams to Gano, Oct. 4, 41c; Oct. 11, 41c.....	82	
	Telegram to Nelson Oct. 23.....	41	
	Warrant No. 437.....		\$ 25 84
Oct. 24	Scotford, printing.....	\$ 5 00	
	P. O. Bill.....	23 58	
	J. E. May, Wilson, Mo., apples for Paris.....	7 08	
	Salary of secretary, October, \$66.66, typewriter \$20.00.....	86 66	
	Warrant No. 438.....		\$ 123 22
Oct. 30	G. A. Stone, Richmond, Mo., 3 barrels apples at \$5.00.....	\$ 15 00	
	Warrant No. 439.....		\$ 15 00
Nov. 6	W. G. Gano, expenses of W. G. Gano for collecting apples for Paris Exposition, September 25, to November 6, as per bill.....	\$ 161 75	
	6 weeks wages.....	60 00	
	Warrant No. 440.....		\$ 221 75

AMOUNT PAID OUT—Continued.

Nov. 23	P. O. Bill.....	\$ 17 54	
	Express \$1.35, \$1.00, \$2.65.....	5 00	
	Scotford, 4,000 programs.....	25 00	
	Salary of secretary, November, \$66.66, typewriter, \$20.00.....	86 66	
	Warrant No. 441.....		\$ 134 20
Dec. 7	Express at Princeton.....	\$ 7 50	
	Telegrams.....	1 06	
	Paper and pencils, etc.....	2 06	
	A. Nelson, expense account.....	4 65	
	Expenses delegates to Princeton.....	34 80	
	Warrant No. 442.....		\$ 50 06
Dec. 7	Premiums at Princeton.....	\$ 96 50	
	Hotel bill of delegates, Princeton.....	28 25	
	R. E. Bailey, stenographer.....	39 55	
	Warrant No. 443.....		\$ 159 30
Dec. 7	N. F. Murray, expenses at winter meeting.....	\$ 8 50	
	D. A. Robnett, expenses at winter meeting.....	15 30	
	L. A. Goodman and assistant, expenses at winter meeting.....	16 00	
	A. Nelson, expenses at winter meeting.....	22 90	
	J. C. Evans, expenses at winter meeting.....	7 50	
	Warrant No. 444.....		\$ 70 20
Dec. 7	A. Nelson, 28 barrels apples for Paris Exposition.....	\$ 115 00	
	Warrant No. 445.....		\$ 115 00
Dec. 26	Express.....	\$ 3 92	
	1 barrel apples for Paris.....	4 00	
	Armour & Co., freight on 80 barrels apples in storage.....	57 14	
	500 wooden plates.....	2 00	
	P. O. Bill.....	20 39	
	Salary of secretary for December.....	66 66	
	Salary of typewriter.....	20 00	
	Warrant No. 446.....		\$ 174 11
Dec. 31	Expenses L. A. Goodman to Kansas State Meeting, Topeka, Kan., Dec. 27-29, bill.....	\$ 8 00	
	Expenses R. J. Bagby to Illinois State meeting, Springfield, Ill., Dec. 27-29, bill.....	10 60	
	Expenses A. T. Nelson to meet H. M. Dunlap, commissioner to Paris, bill.....	13 65	
	Warrant No. 447.....		\$ 32 25
	Total received.....	\$2,316 25	
	Total paid out.....	1,807 94	\$ 1,807 94
	Balance on hand.....	\$ 508 31	

Your committee on finance have carefully examined the accounts of the treasurer and find them correct as reported.

J. C. EVANS.

W. G. GANO.

K. B. WILKERSON.

ELECTION OF OFFICERS.

The present officers were re-elected by ballot with an almost unanimous vote.

President—N. F. Murray.

First Vice-President—D. A. Robnett.

Second Vice-President—Sam'l Miller.

Treasurer—A. Nelson.

Secretary—L. A. Goodman.

President Murray, being called for, said:

Members of the society:—I desire to sincerely thank you for the honor you confer upon me by again electing me president of the Missouri State Horticultural Society. It shows the trust you repose in me, especially so at this time while we are preparing for the Paris Exposition. I thank you again, and promise that I will always do what I can to promote the welfare of the state of Missouri, and the whole state without regard to section.

There is one thing which I desire to mention. We have a number of men in the society capable of making good officers. I think it would be well to amend the constitution so as to limit the time we may hold office. Some other states have such a limit and say it works well. I suggest that we make such provision in regard to our officers except the secretary and second vice-president. If we do this no officer can feel hurt when he is retired from office after holding it as long as the constitution permits.

G. T. Tippin offered a resolution embodying the suggestion made by President Murray.

The resolution was for a change in Art. III of the constitution limiting the time for holding office by the president, first vice-president and treasurer to a maximum of two successive years. On motion the resolution was referred to a committee to report at the afternoon session. The president appointed G. T. Tippin, W. G. Gano and J. C. Whitten.

PLACE OF MEETING.

Buchanan county asked for the next annual meeting to be held at St. Joseph. Messrs. Karnes, Wilcox, Irvine and Hartzell argued the cause.

Springfield was named by Mr. Tippin, who brought a warm and earnest invitation from that locality.

Mexico, by K. B. Wilkerson, asked for the next winter meeting. They have been asking for the meeting for several years.

Farmington was put in nomination by T. B. Chandler and M. Butterfield for summer or winter meeting.

West Plains, by J. T. Snodgrass, asked for the next summer meeting.

Kirkville, by J. E. May, put in a claim for the next summer or winter meeting.

Macon City extended an invitation for a meeting next winter.

Chillicothe asked for either summer or winter meeting.

I like the idea of a summer meeting here. The hotels and the public could, I am quite sure, take care of those in attendance very nicely, and think that rates from the railroad company can be assured and secured. We have no large hall but for a summer meeting we can overcome this matter. If it can be arranged to hold the summer meeting here we shall spare no effort to the end that we may have a good meeting in every sense. I will write at once to ask that we may assure you half-rate on the Missouri Pacific. Will take up the matter with the general Mo. Pacific freight agent, as he is just now interested in encouraging and promoting the planting of commercial orchards. I shall ask for half-rate, one fare for the round trip, and believe it will be granted. Will write you again soon. With best regards,

R. J. BAGBY.
New Haven.

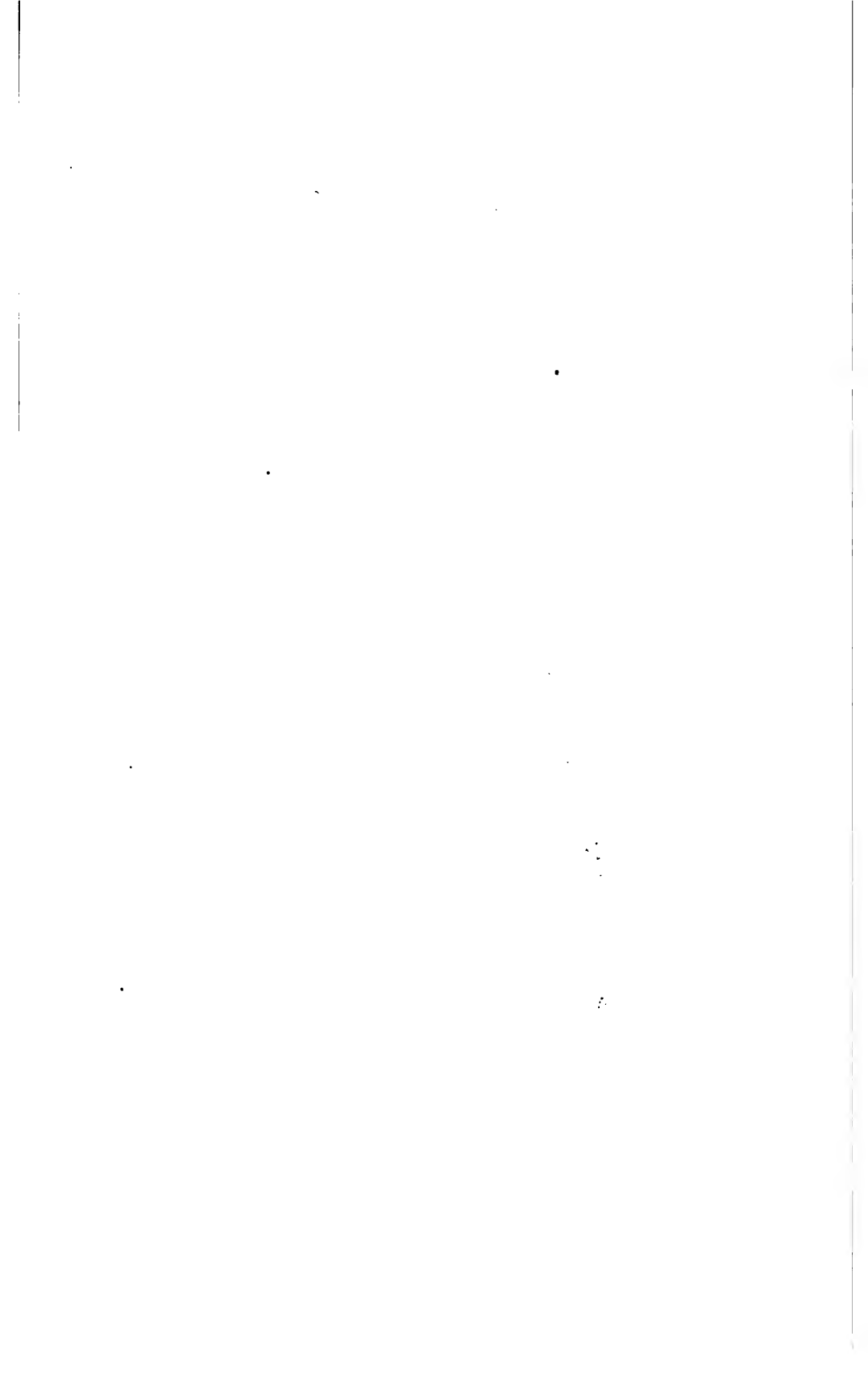
Mexico, Mo., November 25, 1899.

Mr. L. A. Goodman, Westport, Mo.:

Dear sir:—I have tried several different parties to see if I could get some more apples to send you, but have been unable to do so as the apples are not of good quality and not many in a place. Of course I



PICKING PEACHES, OLSEN FRUIT CO., OLSEN, MO.



could get them by buying them, but do not feel able to do that. I wish I had more to send you but can not help my situation. I wish you 'would please send me a copy of last horticultural report. I am yours, and still want the winter meeting.

W. M. PEARSON.

LEBANON Mo., November 25, 1899.

L. A. Goodman, Secretary, Princeton, Mo.:

Dear Sir:—Remember if I am not able to be at winter meeting for reasons set forth, that Lebanon wants the next winter meeting. Free homes for all visitors; \$1.00 rate at best hotels; one fare for round trip when you strike Frisco at any of her points; and a banquet that all members and officers can set with their feet under the same table. The people of Lebanon know and appreciate the benefit derived from a state meeting, and I assure all of a hearty welcome who come.

A. NELSON.

WHAT A PRACTICAL ORCHARDIST HAS TO SAY ABOUT THE ADVANTAGES OF SOUTHEAST MISSOURI AS A FRUIT GROWING SECTION.

M. Butterfield, proprietor of a nursery at Lee's Summit, Mo., and one of the largest fruit growers of the west, was at the Laclede hotel yesterday. Mr. Butterfield has set out about 80,000 trees on the contract plan within the last few years, principally in western Missouri and Kansas, and is now engaged in making some experiments with fruit raising in the southeastern part of the state. "I have made arrangements to start an experimental farm near Farmington," said he, "and some interesting results are anticipated. I will put out sixty varieties of apples, sixty varieties of peaches, strawberries, and, in fact, all the leading varieties of small fruits, for experimental purposes. The country looks like a fine fruit region, but there is not at present a single commercial orchard in that section, so far as I have been able to learn. The soil is superior, and contains the exact quantity of iron which has been long recognized as giving the finest flavor and color. Horticulturists know that a good wheat country will almost always produce fine fruit.

"They also recognize in certain native timber growths the adaptability of the soil for fruit growing. A soil which produces black walnut, sugar tree, wild cherry, pawpaw, red and white oak, hickory and elm, is marked out by nature for fruit raising. Then, instead of having to haul iron filings miles and miles to put around their trees, as the orchardists of other sections have had to do, the fruit growers there will find the exact elements already existent in the soil. I have been engaged for three weeks past in collecting specimens from the old orchard in that neighborhood, which I will display at the coming meeting of the State Horticultural Society at Princeton. I expect to open the eyes of some of the fruit men, too, for this region at the east end of the Ozark range has been almost neglected by fruit growers. In my opinion it will produce almost any kind of fruit, but for pears and strawberries the conditions are almost ideal. They tell me that strawberries from that section have already a reputation on the St. Louis market because of their fine color and flavor, but nobody has gone into the fruit raising business on an extensive scale, for reasons that can scarcely be comprehended by the experienced fruit grower."

W. G. Gano moved that the location of the next summer and winter meetings be referred to the executive committee. Carried.

N. F. Murray said that railroads were beginning to see the advantage of having more fruit planted along their lines, and he thought we should have more consideration when we asked for reduced rates. Some of the railroads now offer half rates when the meeting is held on their lines.

Maj. Holsinger gave the society an earnest invitation to attend the meeting of the Kansas society at Topeka during the holidays.

To the Members of the Missouri State Horticultural Society, Kansas City, Missouri:

Gentlemen:—Swift and Company desire to submit to you a few facts in connection with fertilizers.

In the last few years we have developed a trade on our packing house fertilizers in Missouri and eastern Kansas of approximately two thousand tons per year. Probably three-fourths if this amount is ap-

plied to fall wheat, the fertilizer used for this cereal being a pure raw bone meal.

In the state of Louisiana, in the sugar districts exclusively, where the land was once very rich, in the last few years we have developed a trade which now amounts to approximately eight thousand tons per year, which is shipped between September 1 and May 1; and our business so far this year in that state promises to be greater than any previous year.

In California, which is relatively a new field with us (having been in that market only about two years), our business this season has already exceeded the total business of last season. The California season for using fertilizers is from about October 1 to May 1.

We attribute our success to two facts, one being that before entering a new field, the manager of our fertilizer department makes a personal investigation of that territory as to soil, climatic conditions and the peculiarities of the different crops to be grown, which enables us to put up a properly balanced formula, that is a formula containing the proper percentages of nitrogen, phosphoric acid and potash best adapted to the different crops and to that peculiar soil.

The other fact is that there is no fertilizer made that is equal, as a crop producer, to a fertilizer made from pure animal matter. This fact is being realized more every year by the users. We have demonstrated to the satisfaction of our numerous customers that a given formula made from packing house animal matter is a better crop producer than the same formula made from chemicals, such as acidulated phosphate rock, nitrate of soda, etc. The reason of this is that humus is necessary in soil to get best results, and humus is produced only from decaying animal and vegetable matter. Therefore, animal fertilizers not only supply the growing crop with the necessary nitrogen, phosphoric acid and potash, but they put your lands in fine mechanical condition by this process of producing humus. You probably all know that a land running high in humus is lighter, more porous, and in much better mechanical condition than a soil which is lacking in humus.

Animal matter fertilizers act in your soil very similar to barnyard manure. The latter, however, when you take into consideration the cost of hauling, spreading, etc., is not nearly as economical a fertilizer

as that which we offer you. The average analysis of barnyard manure shows:

One-half of one per cent nitrogen; one-third of one per cent phosphoric acid; one-half of one per cent potash.

This is equivalent to 26.6 pounds of plant food per ton of 2,000 pounds, whereas the average fertilizer that we offer you contains about 486 pounds of plant food, being the combined amount of nitrogen, phosphoric acid and potash which they contain.

It might be interesting to you to know from what ingredients a given formula can be made. The principal sources of nitrogen, phosphoric acid and potash are as follows:

Blood, bones, meat scraps, hoofs, horns, fish scrap, kainit, nitrate of soda, cotton seed meal, castor pomace, phosphate rock, sulphate of potash, muriate of potash, potash salts, etc.

We think that you will agree with us that blood, bones and meat scraps are the most natural fertilizers, and it is from these ingredients that our fertilizers, in which we want to interest you, are made.

Now a word as to a fertilizer for fruits: We have heretofore rather neglected our nearby fruit growers, and have devoted our efforts to other kinds of crops, excepting in the case of California, so can give you no practical illustrations as to benefits to be derived from our fertilizers in our local states; but you may be interested in some remarks regarding what the writer found on his visit to California.

A great deal of the soil in California, as most of you are aware, is decomposed rock in the foot hills, although there is considerable adobe land used for fruit culture. The writer was very much surprised to find so much poor quality of fruit. This refers particularly to the citrus fruit regions. Their oranges and lemons were small, and when there was any size to them, a great deal of the fruit was coarse and thick-skinned. They were also troubled a great deal with dropping of their fruit.

The ranchmen in California we found very much interested in the matter of fertilizing, and they knew as a class, very little about the subject, and were very grateful to have the writer give them the benefit of our knowledge. We found they had been using as a fertilizer (where fertilizing was done) barnyard manure, sheep manure, acid phosphate

and nitrate of soda. While the barnyard manure and sheep manure were both good fertilizers for them to use, they did not contain sufficient phosphoric acid. The result was where this kind of fertilizing had been done, while having a good wood growth, their fruit was very coarse. Where acid phosphate and nitrate of soda had been used, the quality of fruit was considerably improved. But they were troubled a good deal from dropping of fruit. The reason of this, we believe, was that the acid phosphate and nitrate of soda (being very quick acting fertilizers and more of a stimulant than a feed) gave the trees a sudden improvement, but that the sustenance from this kind of fertilization was exhausted before the next application; hence the sudden weakening of the vitality of the tree, and the dropping followed.

In California, as most of you probably know, the tree is working practically twelve months in the year. When the writer was there, there were orange blossoms, tiny oranges and ripe oranges on the same tree.

After a thorough investigation we concluded that what the California fruit growers required for a tree that was working practically all the year around was a steady feed, and not a quick acting fertilizer, such as they were getting from an acidulated article; and we have since convinced a large number of the California ranchmen that a packing house animal fertilizer, unacidulated (that is, not treated with sulphuric acid) is the very best fertilizer for them to use because it furnishes a steady sustenance to the trees, and that one application is not exhausted when the other application is made. They usually make two applications a year; and this continuous food keeps the trees in a healthy condition, and has reduced the dropping of fruit materially.

The experience we have had with our California brands in that state has demonstrated to the entire satisfaction of our customers that the proportion of nitrogen, phosphoric acid and potash for the different soils as directed by us have brought about best results.

Our formulas are based on the assumption that a tree has been receiving the proper proportions of nitrogen, phosphoric acid and potash, but our agents are all thoroughly posted by us as to how to remedy any apparent deficiency in wood growth, leaf, or quality and size of fruit; and where there is an apparent deficiency of either of these three parts,

we make up special formulas accordingly. To give you one illustration of our remedying apparent defects, will say that we prescribed a fertilizer for Mr. George T. Frost, of Porterville and Exeter, California, who said that he had one orchard in which the leaves, as soon as the cool weather set in, turned a mottled color, which he considered was an unhealthy sign. We put up a fertilizer for this, which, besides the nitrogen, phosphoric acid and potash, contained five per cent sulphate of iron, and we have a letter from Mr. Frost, dated November 21, 1899, from which we quote the following:

"I applied your fertilizer in February and March. The groves are showing the benefit now. I say 'now' for the reason that, as I told you, some parts of the grove, on light soil, would show mottled or yellow leaves as soon as the cold weather sets in. This has been the case for the past three years, and at this writing it is hard to find any of this trouble through the groves on this soil. I have nothing to credit the improvement to excepting the fertilizer applied during February and March."

We have several good letters from our California customers regarding their experience which we will publish in the near future in a pamphlet, and shall be glad to send your association some of these pamphlets when printed.

Now, we do not ask you, or any class of farmers to take our word for all these things. But we would ask you to give this matter of fertilization your close consideration; and we hope that this paper will be the means of getting you sufficiently interested to make at least some small experiments for your next crop. As our fertilizers are not "stimulants," they should be applied along in the winter to get best results. The quantity we recommend for fruit trees is one-half pound per tree for each year of age, that is, on a ten-year-old tree use five pounds.

The best way to apply it is with a fertilizer drill, and drill it into the soil from eight to twelve inches deep—not close to the trunk of the tree, but fully two feet from the tree. The roots will find the fertilizer even though not put very near to the roots.

For small fruits we recommend about 400 pounds per acre. Of course our formulas are for small fruits, such as strawberries, black-

berries, grapes, etc., would be quite different to a formula for apples, pears, etc.

Now, as regards your being able to get our fertilizers as cheaply as possible: We would like to make an arrangement with the members of your horticultural society, to whom we will agree to furnish our fertilizers at wholesale prices, that is, at same price as we would charge our distributing agents. This will enable you to obtain your fertilizers at first cost.

We feel sure that if you would make some experiments the coming season, you would be very pleased and surprised at results and that it would be the means of considerable business between us, to our mutual benefit.

We thank you for this opportunity of putting this matter before you.

Yours respectfully,

SWIFT & COMPANY,

Per F. Rayfield.

CRYSTALIZED OR GLACE FRUITS.

By Mrs. H. B. Monteith, Lakeport, Cal.

The art of crystalizing or preserving the fresh fruits in their natural form, flavor and color is yet in its infancy in this country and therefore offers an extensive and lucrative field of labor, especially suited to ladies. To make these most dainty confections, perfect in their naturalness, requires a dainty touch with a very fine perception of the distinction between good, bad and indifferent fruits, both in the fresh and finished state. There has always been an air of the most profound mystery and secrecy about crystalizing fruits. Manufacturers have most jealously concealed their methods from the public. While on a visit to Los Angeles a year ago, my attention was drawn to the fine display of crystalized or glace fruits there shown.

Every one concedes the deliciousness and wholesomeness of crystalized fruits, but hitherto the cost, the time required for their preparation and, perhaps the "fussiness" of the operation have tended to dis-

courage their use in the home and largely prevented their manufacture upon a commercial scale. These obstacles need no longer stand in the way of a general enjoyment or the manufacture of these delicacies, as they may now be produced equal in quality to the French article and possibly at one-third the cost of the latter, and in a very greatly lessened time.

For all this coast there are less than five crystalizing firms to supply the demand; no wonder the price of the fruit is high and in reach of only the moneyed few.

I was told the time required to crystalize fruit was from six to eight weeks from the time the fruit was fresh until finished for the trade. This fact would seem to be a great drawback to many who would like to engage in the business, and so it was to me at that time, yet I felt satisfied it was a paying business. After several years of investigation and experimenting, and any number of failures, I claim to have found out an entirely new process of making the crystalized or glace fruits without the aid of coloring matter or chemicals of any kind; consequently all fruit by my process has its natural flavor, form and color. More than that, I have done away with the old-time stickiness, producing a dry, crystalized fruit that may be eaten from the hand with kid gloves without soiling. I can also give you the fruit ready for the trade in from five to ten days, at a profit of one hundred per cent. All kinds of fruit may be crystalized, also berries, and some vegetables. Farmers and fruit growers may add this business to their fruit drying with little expense and with a very great deal more profit.

The glace strawberry is a novelty for which you will pay seventy-five cents per pound. This fruit alone would open up a new industry of great value because of no competition on it, and one that has never yet been on the market. Glace peaches, while not new to the public, are scarce and expensive, selling from fifty cents to seventy-five cents per pound, and from all reports and hearsay, I would claim Missouri the banner state for peaches and strawberries. Time and space will not permit me to go further into the details of this interesting and profitable business, but I should be pleased and willing to answer any and all questions referred to me in my distant home.

SIXTH SESSION—Thursday Afternoon.

The committee appointed to consider the change in the constitution was called for and reported in favor of annual elections, and allowing the three officers to serve only two successive terms. The resolution was unanimously carried.

Following is the report:

Amendment to Article III of the Constitution of the Missouri State Horticultural Society:

The officers of this society shall consist of a president, vice-president, second vice-president, secretary and treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall be for one year, beginning on the first day of June, following their election. The president, first vice-president and treasurer shall be eligible to but one successive re-election.

GEO. T. TIPPIN, Chairman.

J. C. WHITTEN, Secretary.

W. G. GANO.

Secretary Goodman read the following:

Question.—Would you spray a young orchard, five years planted, which has never borne a crop of fruit?

Prof. J. M. Stedman.—It depends upon whether he has anything to spray for. If there are no insects on the trees next spring, do not spray. I would never spray unless I had something to spray for. It depends upon conditions which are to be developed next spring.

Question.—If the trees promise a crop of fruit next year would you spray?

Prof. Stedman.—Yes; about one week after the blossoms have fallen. The flowers, especially the stigma, may be injured by spraying at blooming time. Never spray while the tree is in bloom.

Prof. Whitten.—I would not spray for scab or other fungous disease unless I had reason for doing so. It might be advisable to spray a young orchard for scab or other disease if it was situated near an old

orchard that was infected. I would watch closely and spray when necessity for it came.

Question.—How long would you consider it safe to grow blackberries in an orchard?

N. F. Murray.—I have in my eight acres of orchard Snyder blackberries for three years. These berries protect the trees. I have never grown an orchard that looked better. The berries pay from \$35 to \$60 per acre. How long this will continue I don't know.

J. H. Karnes.—I have the two grown together for nine years. It has paid every year. I don't think the berries have injured the trees in any way whatever. The trees, by partial shade, have helped the berries. It is safe for eight or nine years. The same is true of the raspberry.

Question.—How far from the trees are the berry bushes?

Mr. Murray.—Mine are eight and one-half feet from the trees.

Mr. Karnes.—There is no injury from having them close, though they will be more difficult to get out; but a healthy, vigorous apple tree will easily get the better of the berry bushes.

Prof. Whitten.—The land in the orchard will be better for having the blackberries in it for ten years.

J. C. Evans.—The great trouble is to get them out when done with them.

Mr. Callaway.—Will an apple orchard be injured by raspberries or blackberries?

Maj. Holsinger.—Not by the blackberry or black raspberry upon good soil. To get rid of them is more of a bugbear than anything else. Cut them off, plow them up and they are gone. The best orchard I have was grown with blackberries between. It paid well; was on rich land. The rust comes along in five to seven years and cleans them up. There is no preventive. If it was not for the rust this whole country would be one great wild blackberry patch. Even the Snyder is rusting.

I would not plant red raspberries in an orchard. Trees among blackberries in my orchard are fifty per cent larger than those among red raspberries. The trees never do recover from the injury caused by red raspberries. I see no objection to blackberries in a young orchard.

Mr. Wilcox.—We have both together. You will have no difficulty in getting rid of the berries under the trees.

Richmond, Mo., Dec. 5, 1899.

L. A. Goodman, Secretary State Horticultural Society, Princeton, Mo.:

Dear Sir.—I submit the inclosed questions for your "Question Box" at horticultural meeting. Hoping to have them answered for my own information and no doubt many other amateur fruit growers will be enlightened thereby.

Yours truly,

GEO. A. STONE.

Question.—Apple fruit buds are said to be developed in October and November. How are they to be certainly distinguished from leaf buds?

Answer. The round, large plump buds on spurs are usually fruit buds, but you cannot always be sure without examination with a glass.

Question.—What varieties of apple trees are long lived and what are short lived? Please name a few leading winter varieties with average life of same.

Answer.—Stark, McAfee, Northern Spy, Trenton's Early, The Northern Spy is the longest, probably.

Prof. Emerson, of Lincoln, Nebraska, being called upon, said: I am very glad to meet with you and hear your papers and discussions. There is much of interest in Nebraska, though conditions are different. Northwest Missouri and southeast Nebraska are similar. The greater part of Nebraska is a more or less undulating plain. There are hills in the southeast part, and now I know where they come from. Your secretary asked me to say something about what we are doing in our state, but as I went there only last summer I don't like to tell what we are doing. I would like to have you come to our winter meeting the ninth and tenth of January, at Lincoln. All of our horticultural society meetings are held at the university. The university is fortunate in this respect. All the agricultural societies meet at Lincoln.

J. J. Kiser, Stanberry, said:—Prof. Whitten casually made the statement that honeydew was the exudation of aphides. I would like, with all respect to his learning and position, to enter a protest. I have kept bees for twenty-seven years as my principal business; have watched carefully the conditions when bees gather it, and find invariably that it is developed at a time of a very low

barometric pressure. When we take into consideration that there is an atmospheric pressure of about fourteen pounds to every square inch of surface, or twenty-eight pounds to every square inch of leaf, and when we are also told that men, climbing our highest mountains, bleed at nose, eyes and ears caused by the lack of external pressure, what is more natural than that during a very low atmospheric pressure there should be rupture of cell structure in our tender plants, leaves or twigs, that the sap should ooze out and be evaporated on the surface of the leaves and form a feeding ground for the aphides, which with their system of propagation—metagenesis and parthenogenesis multiply so rapidly, being an effect and not the cause of honeydew and kindred phenomena such as blight. What condition could be imagined more favorable to the development of blight than a tender fruit twig or leaf, its cell structure ruptured by the above named causes and conditions? A blight spore comes flying through the air, finds a lodgment in a microscopic crevice full of sap, a perfect condition to grow in, gets its root system established and rapidly pushes its destructive growth along until the whole tree is ruined.

Three conditions may exist during these low barometric periods: 1st. Certain varieties of trees and plants may be able to stand the lack of pressure without rupture. 2nd. They may be ruptured and there be no blight spores, or 3rd. They may be ruptured and a spore, or hundreds of them, may find a suitable lodgment to start whole plantations of mycellia and destroy the tree or plant.

Now for the practical feature of this theory, if there is even a mere possibility of its being true, it should be investigated, and with all due respect, I submit it for the investigation of scientists, who, with infinitely better facilities and opportunities may demonstrate the truth or falsity of it, and if true how much easier it will be to head off much of the damage now sustained by fruit growers by immediately spraying trees during low barometric periods before the spores find a permanent foothold.

SOUTHEAST MISSOURI AND ITS RESOURCES.—POSSIBILITIES OF FRUIT GROWING.

Perhaps no section of country has been more thoroughly misrepresented or more generally misunderstood than southeast Missouri.

The word is scattered generally all over our state and many other places besides, that southeast Missouri is a dismal swamp; when the truth is that only ten counties in the extreme southeast portion have any wet or so-called swamp land at all. The reason I call them "so-called swamp lands" is because only seven of them have any wet or so-called swamps, while they present only about one-fourth of their entire area as subject to overflow, and much of this is of a wet nature and not caused by overflow. These low lands are all being drained by large ditches, being dugged by steam machinery under the Missouri ditch law, which is an exact copy of the Ind. ditch law, which reclaimed so much of the wet lands of that state, and made it the finest agricultural and fruit land in all the state of Indiana.

Several drainage enterprises are now under headway costing all the way from \$50,000 to \$100,000 each, and when these ditches are all complete, which will be in the near future, these rich, level bottom lands will be the finest agricultural, stock and fruit lands in the world; and their fertility will simply be inexhaustable, while the value of these lands will be realized only by men of the keenest perceptions.

Please hear what a civil engineer has to say on the so-called swamp lands, after having been there and did much surveying for the ditches being dug: "Of actual swamps, but a few thousand acres can be found in southeast Missouri. The area subject to occasional overflow has been reduced half within a few years by mill men cleaning the river of 'rafts' and when an inexpensive system of ditching is introduced it will all be tillable. It is as easily drained as were the prairies of Illinois and Indiana.

In every instance where the clearings have been extended across the slashes the water has disappeared and the land has become safely tillable.

The bottom lands are loose and easy of cultivation and can often be plowed every month in the year.

It should be noted here that the lakes marked on the maps are over half missing when you travel across their locations. Indeed they never had an existence and hundreds of thousands of acres so marked were not only never overflowed, but were in fact beautiful prairies altogether above the highest floods. The name swamps was attached to these lands by reason of an act of congress passed September 28, 1850, donating to the several states all swamp and overflowed lands lying within their boundaries, in trust that the states would severally drain and reclaim them, and after paying the expenses of reclamation convert the remaining proceeds of the sales into the school fund. The cupidity of the states resulted in hundreds of thousands of acres of the best bottom lands, and in fact of thousands of acres of hill lands being certified and transferred to the state of Missouri as swamp and overflowed which were always safe from overflow.

The beautiful prairies of Dunklin county, which are now a succession of the handsomest farms in Missouri, were classed as swamp and overflowed. When the timber is removed, it will be found that there are not 40,000 acres of actual swamp land in southeast Missouri, and that all of this can be drained at small expense. It need not be stated that the name 'swamp land' has operated greatly to the injury of south-east Missouri, causing many to avoid it who would have become citizens had they known the real facts. A personal examination will soon satisfy the most skeptical. Reading is believing, but seeing is knowing."

As an eye-opener to the prejudices I will submit the statistics of the exports of wheat and flour from four counties that lie right on the Mississippi river, compiled from the state labor commissioner's report for 1898: Cape Girardeau county shipped, wheat, 129,000 bushels; flour, 26,162,948 pounds. Scott county shipped, wheat, 211,000 bushels; flour, 12,699,000 pounds. Mississippi county shipped, wheat, 415,000 bushels. New Madrid county shipped, wheat, 423,000 bushels. And all these millions grown in a swamp? All false! When the facts are known as they really exist, homeseekers will realize what they have lost by not being informed truthfully.

The timber is as fine as can be found in any part of the state, consisting of cypress, gum, walnut hickory, white oak and black oak of the finest quality, ash poplar, linden, hackberry, wild cherry,

butternut, mulberry, dogwood, sugar tree, elm, pawpaw, etc., while one of our counties shipped out 70,652,000 feet of lumber. In many instances when a man buys a home of 100 acres of land he can sell enough timber off of it to more than pay the purchase price. We have the finest building stone in the world scattered in immense quantities over our section of the state as well as fine prospective marble. The immense quarries of limestone are numerous, while granite is being quarried and shipped out by the car loads to different states for building and for tombstones. Grindstone quarries are plentiful, too. Our copper mine sold in Ste. Genevieve county last week for \$100,000, and the silver mines of Madison county are attracting capital thitherward, while our lead mines are second only to that of the Joplin district. The great number of people of different mining towns furnish us with the best home market for all farm and fruit products west of the Mississippi river. Irish potatoes are being shipped into these mining towns now (last week in November) by the car load and scores of people make a good living by peddling farm and fruit products into these towns each week. New lead mines are being found every week and last week 3,000 acres of land was sold in Madison county for mineral purposes. Thousands of acres of raw land with the finest of timber and granite can be bought in this, Ste. Francois county, for from \$2.00 per acre up, and where farmers have settled on these lands and set out fruit trees they are as fine, thrifty and fruitful as can be found anywhere in the state.

Our railroad facilities are not behind those of any other part of the state, and we are within three hours of St. Louis and nine hours of Chicago, consequently we have the cheapest transportation rates possible to the great city markets; and besides our great railroad facilities we have the great Mississippi river with the cheapest freight rates in the world, to St. Louis, Memphis, New Orleans, and thence to the ports of the world. Our schools are wideawake and on a level with those of any other part of the state. We have a college or seminary in almost every county seat, besides the great Normal at Cape Girardeau. In our own "Athens of Southeast Missouri," Farmington, with her 2,500 population, we have two colleges and one seminary, besides two private schools and one of the best public schools in the state. Our church privileges

are unsurpassed, all the denominations being well represented, and Sunday schools within the reach of all. Taxes are as low as can be, considering the immense amount of money expended annually on our schools, rock roads and other improvements. The streams of water are numerous and as clear as crystal, indicating the greatest purity.

Our red soils are the finest in the state, yielding abundantly of all the grains, fruits and vegetables. Wheat, with proper preparation of land, good seed, etc., will yield from 10, 20, 30 and 40 bushels per acre, and corn all the way from 25 to 100 bushels per acre, and Irish potatoes from 100 to 300 bushels per acre.

Stock raising is one of the most important branches of industry now. Horses, cattle, mules, sheep, hogs and poultry are grown and marketed in immense numbers, and the finest watermelons in the world are grown and shipped out of southeast Missouri by the car and train loads to all the large cities in the United States, east to Chicago, Cleveland, New York, Philadelphia, Buffalo and Boston, and west to Kansas City, Omaha and Denver.

But why enumerate the many advantages of our great southeast section when we only wish to speak of them as a side issue, when compared to the fruit growing possibilities? As compared with other parts of the state, apples grown in southeast Missouri are equal, and in many instances superior, to those grown in any other part of the state. In 1889 I went to the great St. Louis fair and exposition and took with me one dozen Ben Davis apples grown in my own orchard and to my great surprise, there was only one lonely specimen of the apple kind there that was equal to the ones I carried with me, and not a single apple at either place that was equal to mine.

The apple grows to the greatest perfection in our part of the state, and takes on the highest color and finest quality. There is no land in the whole United States that can show apple trees any older and still producing annual crops of good apples. Ste. Genevieve is the oldest town in Missouri, being settled in 1755, and old orchards are still there in and near the old French town that have been set out so long that no one now living can give the date of their planting.

Within one mile of Ulam, Missouri, there is an old orchard still vigorous and fairly productive that was set out in 1845. I am very

sure that these statements are correct and they show that the climate of southeast Missouri is peculiarly adapted to the apple and its longevity; and the rainfall in southeastern Missouri is much greater than it is in all western and southwestern Missouri, Kansas, Nebraska, Oklahoma, etc.

Upon turning to the map of the United States showing the distribution of rainfall, we find that southeast Missouri has an annual rainfall of 40 to 50 inches, while all the western, northwestern and southwestern part of the state has only 30 to 40 inches, showing ten inches rainfall annually in our favor, while central Kansas, Nebraska, and Oklahoma have only 20 inches. Then when we examine the physical map of Missouri we find that the highest land in our state is in Wright county, where it reaches an elevation of 1,700 feet above the level of the ocean and the next highest is in my own, St. Francois, and Iron counties, where it is 1,600 feet, or only 100 feet lower than the now noted fruit region of southwestern Missouri. This fact of our great altitude connected with the high average rainfall, make our claim doubly strong for southeast Missouri as a fruit section.

The peculiar red soils of our section produces the finest apples in the world, having an abundance of iron in it which gives the fruit that high color and rich flavor that are not found in fruit grown in any other part of the state, or in any other state.

Why fruit growing has not been more fully developed in southeast Missouri can only be accounted for in any other way than that our part of the state has been misrepresented as a swamp instead of as an ideal place to have a home and plant an orchard. As to varieties of apples, Ben Davis, Wine Sap, Gano and all other leading varieties grow to perfection here and we have kept Ben Davis in our own cellar till in June when our strawberries were nearly gone.

Peaches do equally as well as apples and I am well acquainted with two farms near that have never failed to produce a few peaches annually. Even this year there were quite a number of peaches on these two farms.

I have never seen peaches at any fair that were finer than we grow here. All the leading varieties do well here, and the famous Elberta

grows so large and red that I am afraid to tell you how large it grows for fear you would accuse me of misrepresentation.

I have two seedling clings that are large and fine. We have named them Anna and Ethel after our two little daughters.

Our merchants are always asking in the fruit season: "How is your fruit? Will you have any peaches that are fine? If so, we want to handle them for you, etc."

And strawberries! Well, we grow them. I have grown them as large as common apples and sold \$56 worth from one-tenth of an acre, besides what we ate.

Visitors from Ohio and New York have said they never saw finer ones than they found in our grounds. Neighbors have grown them equally as large. As to varieties, we have never found anything to equal the old Crescent and Bubach, fertilized with the Jesse. Our only trouble is we get too many runners on the Crescent and too few on the Bubach and Jesse.

I am quite sure that I have grown as fine grapes on my own farm as ever grew in Ohio, New York, or any other place noted for grape growing east of the great Father of Waters. One man near Farmington this year grew in his garden one ton, two hundred and twenty-two pounds of grapes which he sold at four cents per pound which brought him \$88.88 just from his few vines in his garden. Others have done equally well or better and the growth of the vines is enormous.

In my own vineyard for family use I have nineteen varieties of the finest table grapes, but in the field vineyard, set last spring, I have only two varieties, viz.: the Concord and the Moore's Early. I am testing Campbell's Early and other newly introduced varieties alongside the old standards and hope to be able to give some interesting reports some day in the near future. All the leading varieties do well here and grow large crops annually. In 1897 we gathered our last bunches of grapes on November 10, and they were still in perfect condition in the bags. I hope that all grape growers will remember that the celebrated Bushberg vineyards and nurseries are in southeast Missouri, and all the grapes that do well anywhere in north temperate America are grown and tested

there and reported in the Bushberg grape manual which is recognized as the best authority on American grapes.

Pears, plums and cherries do well here and are perfectly at home in our climate. The Keiffer pear grows to its greatest perfection here and I am glad to say that I have yet to see a Keiffer pear tree blight in our section. They keep with us till Christmas and are the finest pear for canning in the world, having just enough toughness about it to prevent it from falling to pieces while cooking.

Blackberries, raspberries, gooseberries and currants do well and sell for good prices, although the demand has never been supplied. Will say that if anyone wants land in the fruit paradise of Missouri he can get it at prices that will astonish those not informed. But desire to say that I have none to sell

Yours sincerely,

T. B. CHANDLER,

Farmington, Mo.,

Sec. St. Francois Co. Hort. Society.

THE KEIFFER AND GARBER.

By R. J. Bagby, New Haven, Mo.

The Keiffer is now being more largely planted than all other sorts combined for commercial purposes. It has been before the public for years and has proven very profitable as a commercial sort. It blights some, but mostly at the twigs and will quickly recover from a severe pruning. My opinion is that this sort ought always to be grown on French stocks rather than Japanese. Our experience has been that trees are more likely to blight if grown on the Japan stock. Much of the soil in the eastern and southeastern part of the state is adapted to the growth of the Keiffer. In Jefferson, and counties adjoining, the favorable conditions of the soil and climate are especially noticeable. Trees are healthy and fruit almost perfect.

The fruit matures late enough to ship anywhere and its high color and size will sell it on any market at a good price. The Keiffer has come to stay, and deservedly so.

I regret to say the Garber has been disappointing in many respects.

It is a good grower, somewhat less liable to blight, when young, but does not come into bearing as young as the Keiffer, not so productive, fruit of no better quality, and ripens earlier.

From the fact that the Garber does not blight so easily when young it has been regarded by some as practically "blight proof," but as the trees grow older, it has been my experience and observation that loss from blight is very considerable. For commercial planting, it has no advantage over the Keiffer, and in my opinion, has many disadvantages.

There is probably no tree in any greater demand than the Keiffer for commercial planting. This demand exists from Maine to California, and it is now recognized in Michigan and New York, as well as in Missouri and Illinois, as the pear for profit. In a commercial orchard I would plant some Garber, but many more Keiffer.

NURSERY TREES—ARE THEY ADVISABLE?

Mr. President, Ladies and Gentlemen:

Having been requested by the secretary for a paper on the pear, in response I will not attempt to instruct the experienced horticulturalist, but may be of some benefit to the amateur fruit grower and bring out a discussion on the subject that will prove to be a benefit to all.

Yes, I think nursery grown trees are advisable for the reason that they are freer from disease and insects. Any nurseryman, to be successful in the propagation and growth of trees and plants, must be thorough in his work, i. e., start with sound seed and healthy stock, and then follow with thorough cultivation. It is an admitted fact that in young trees and plants as it is in animal life if kept in a thrifty condition by good care and attention they are less subject to the attacks of disease and insects.

Take for example the apple tree borer. It is never seen, or at least I have never seen one in well cultivated nursery trees; so it is with other insects and diseases. The healthy vigorous trees are more able to resist the disease and insects.

These are the reasons for which I believe nursery grown trees to be advisable.

As to varieties, I have had very little experience with the pear. But will say that in my travels over this part of the state I have found

more Keiffer and Duchess pears than all other kinds and have noticed the same trees of these varieties bear year after year.

W. H. LITSON, JR.,
Nevada, Mo.

INSECTS OF THE PEAR.

Prof. Stedman.—The pear is liable to be attacked by most of the insects that prey upon the apple. It is also attacked by the twig girdler from the forest which deposits its eggs in the small limbs, goes down the twig further and there girdles it. These twigs drop to the ground. Gather them and burn right away before the young hatch out. The twig borer is troublesome in the southern part of the state. They trim the tree. Another insect, the pruner also, eats the twigs from the inside so they break and drop off. Gather and burn. Borers and codling moth are the same as those of the apple and should be fought in the same way as I gave for the apple. The gouger attacks the pear and is difficult to combat. It is a large *curculio* which eats holes in the pear while young. The leaves are subject to the attack of a great many insects. Spray with the arsenical compound if they eat portions away. If they are sucking insects spray with tobacco water or kerosene emulsion.

DISEASES OF THE PEAR.

Prof. Whitten.—There is one principle disease of the pear in this state of which some of you have heard in the past. If we could get rid of it the business of pear growing would be so profitable that it would soon be unprofitable. At the present time it prevents overproduction. It is the pear blight. If we could control it pear growing would be easy. Scab attacks the pear as the apple. Use the same treatment; it yields quite readily to Bordeaux mixture. If there is any other disease you have noticed in your pear orchard I shall be very glad to discuss it with you.

Maj. Holsinger.—There is one thing worse than all those that have been named: that is thirty-two degrees below zero.

Mr. Wilcox.—Would spraying be of any benefit?

Prof. Whitten.—Some diseases may, I think, be kept in check by winter spraying. The pear requires spraying in the summer to keep

the foliage healthy. A whitewash spray will prevent peach leaf curl, and prevent to some extent the swelling of the buds on warm sunny days in winter. Whether it can be made of practical benefit I can not say, though I have letters from growers in other states saying it has been profitable.

Maj. Holsinger.—I have several thousand pear trees and I find them so badly damaged by the cold of last winter that they are breaking off at the bud. This is true of all trees ten years old or less. Those cut down have made a new growth of six to seven feet, but they are very easily broken off. What shall we do with them?

Prof. Whitten.—When a man don't know he had better confess his ignorance. This is what I am trying to learn. If it were not for the blight, I would recommend judicious cutting back. Young trees were so injured by the past winter that the only sound wood is a thin shell of this year's growth. The new wood is not strong enough to support the tree.

C. Hartzell.—I want to ask my friend across the line whether he took the advice of that Carthage man seven years ago and used calomel on his trees? There is a very fine pear tree at White Cloud, Kansas, which has borne more than one car load of pears and is still all right. Salt the ground for pear blight.

Maj. Holsinger.—I know a tree in Kansas that was planted in 1830. It is two and a half feet in diameter and still in good health. From my early planted trees I have gathered fifteen or sixteen crops and they are still in good condition. The winter did not hurt the older trees like the young ones. The past winter did more damage than the blight and every other disease that ever struck this country.

I do not believe there is a sound and healthy tree in this country. The inside will decay and the tree snap off. Every variety, even the Early Harvest, is in the same condition. So far as salt is concerned, I am reminded of our friend Slocum who, for years, claimed that he had found a preventive of blight in salt. He mentioned it time and again. After so long a time we noticed that he stopped saying anything about his remedy. Upon inquiry we found he had salted his trees to death.

Prof. Whitten.—I think the young trees with a thin shell of sound wood on the outside will come out all right if they don't break off before they get strong enough to withstand the storms. I am trying the plan of cutting some of them back. I don't know whether they will do well or not. If the trees have made a good growth this year I would treat them just as if nothing had happened.

THE GRAPE.

By Samuel Miller, Bluffton, Mo.

As this subject has been assigned me, I will commence with its history as far back as we can trace it.

It was cultivated before the deluge. Whether Noah took rooted vines or cuttings with him, when he entered the ark, does not matter; but the first thing he planted when he came out of it was a vineyard. This certainly gives the grape a prominent character among the productions of the earth. That it is one of the best and most wholesome fruits is also admitted. When Noah's vines bore fruit he made wine and got drunk; this is what countless thousands have done since then and will most likely continue to do so to the end of time.

From that first vineyard of sacred history to this time the grape has held a prominent place among the good fruits of the world. Its range of latitude is almost as great as that of any other fruit except the strawberry. It grows in swamps and on high mountains, in a great variety of soils, yielding many varieties, from the little insignificant summer grapes of our Missouri islands and bottoms to the magnificent Muscats, Hamburgs, Moroccos and Syrian. The latter has grown bunches that weighed 28 pounds. A traveler once stated that he came across grapes in Afghanistan with bunches half a yard in length and with berries as large as small walnuts.

In the early part of this century the grape received in this country but little attention and the attempt to grow *Viniferas* were failures. The fox grape (*Labrusca*) in the east and the fort grape were about the only ones that survived, and even these, to my personal knowledge failed some years from rot and mildew. Some years the first named all rotted, and the latter I have seen when the

bunches looked as if they had been made wet and then rolled in flour, they were so white with mildew.

Now, where are we? Here in Missouri we can grow good grapes, and we have boasted about it in times past, notwithstanding there are car loads imported into our state yearly from Ohio and New York. This should not be so, as we can grow our own grapes. Of course the early ones are soon gone, but we have late ones; such as Goethe, Woodruff Red, Norton, Cynthiana, Kentucky, Ozark and Hermann, that can be kept late if properly cared for.

There is no occasion for me to dwell on the subject of cultivation in this paper, for every journal gives instructions in this line, or on propagation of vines, as this topic is also freely discussed. That some varieties grow readily from cuttings while others can not be grown successfully, in that way each one will learn by experience. Varieties differ in their habits and there is no definite rule to be laid down for all varieties.

Of the newer varieties introduced within the last few years, I will mention Campbell's Early, of Concord parentage, bunch and berry large, black, quality superior to Concord and ten days earlier. This should be in every collection and can now be bought for fifty cents a strong vine. I paid \$2.50 when getting my first vine. Then we have the McPike, a most noble grape, a seedling of the Worden, just like it. (but more so) larger and better. Hicks, a grape brought out by Henry Wallis, of Western St. Louis county. This grape is destined to make its mark. The bunch and berry are above the medium, black, quality as a table grape the best, and it makes a claret wine hard to beat. The Kentucky is another of recent introduction, of the Norton type, but larger in bunch and berry, a pleasant table grape and will no doubt make a good red wine. Just here let me say that the Norton and Cynthiana are considered by most folks as only wine grapes, but I deem them excellent for eating and prefer the latter when it is ripe to the Concord.

Among the older varieties I would name the following for a small collection for the amateur:

For white—Green Mountain, Moore's Diamond and Pocklington.
Red—Brighton, Catawba, Woodruff Red, Goethe.

Black—Early Victor, Worden, Defiance and Norton.

If people only knew it and would carry out their knowledge in a practical way every man owning a house could have grapes enough to eat and not occupy land available for ordinary plants. Plant against the walls of the house and train up under the eaves and there will be neither rot nor mildew to injure them.

The danger from swallowing grape seeds is greatly exaggerated, in my opinion; but at the same time, a grape fit to eat should have the seeds rejected. It is true that some varieties are sweet between the skin and pulp, the latter swallowed whole, which if bursted will be somewhat acid inside, but that is not my way of eating grapes.

I pity the man who has land and no grapes; yet at the same time I will say that he is neglecting a duty that he owes to himself, his family and the public in general.

In concluding this paper, I must not forget to give an account of the latest great acquisition. It is an everbearing grape, one that has on the vine ripe fruit, green bunches, grapes no larger than bird shot and blossoms all at the same time. There is ripe fruit from July until frost, which they did not get at Belton, Texas this season, until November. The bunches are large, sometimes weighing three pounds, berry large and the quality No. 1. I have had two opportunities to taste this grape and see this grape in different stages of development, therefore write from experience. I have a vine of it, that has made 20 feet of wood this season. This may indicate what this vine will do here next season. It is of the *Vinifera* class and will have to be protected in winter. J. R. Allen, Belton, Texas, is the originator of this new grape. To save trouble I will state that I have no vines or wood of it for sale.

PLANTING AND TRAINING VINEYARD.

By T. A. Pepper, Independence, Mo.

To the Missouri State Horticultural Society:

When I received word from the worthy secretary that he wanted me to prepare a paper for the society, I felt thunder struck, although I never heard of anyone being struck by thunder. Pardon my inability to express my feelings. Knowing myself as I do, never having prepared a paper on any subject I finally come to the conclusion that the worthy secretary was losing his mind and thinking it might only be temporary, I wrote him to give the subject to some one who could handle it as it should be handled. But what was my surprise when I found out his case was hopeless and still insisted that I was the man he wanted on that subject. After thinking the matter over I decided the best thing I could do was to do as he requested. Now you will have to accept this paper for what it is worth, and should it prove worthless, you know whom to blame for cheating you. In presenting this paper to you for consideration I am not going to tell you how long ago and where the first grapes grew, and the first man that ate them, for I never saw the place, the grapes nor the man, but simply tell you what I would do had I the means so to do in planting, cultivating, pruning, packing and marketing grapes. In the first place select the highest ground on the farm, but avoid a steep hillside, but if compelled to plant there, mulch instead of cultivating. The ground should be drained naturally or artificially and be moderately rich. Prepare the ground by plowing and subsoiling to the depth of fourteen to eighteen inches. Make the ground in as good shape as you would a strawberry bed. Then mark the ground off ten by ten feet if plenty of land, if not mark rows eight feet apart and ten feet apart in the row, running rows north and south. Always procure vines from a nursery that makes the propagation of the grape vine a specialty. Such nurseries grade their vines No. 1 and No. 2, and get the No. 1 every time; if they be one, or two years old. I have purchased vines from a great many nurseries, having dealt with one firm in New York for nearly thirty years, sometimes buying in quantity and at other times only a few, and

never received a spurious sort or a poor vine. The man that makes the grapevine a specialty will put the vines at your door in better shape if he is a thousand miles or more away than the home nursery unless he is a specialist. On receipt of vines from nursery untie the bundles, dampen vines, spread them thinly and cover with ground so they will be in good shape when ready to plant. Having the ground ready, dig the holes deep enough so that when roots are spread out fan shaped at an angle of forty-five degrees, they will not be cramped, making the hole so the north side slopes to the south. I now commence to concentrate forces by shortening the roots of vines to within eight or ten inches and cutting top off to three buds. Having thus prepared the vines I put a few in a bucket of water and commence to plant by placing a vine with roots spread out fan shaped on the inclined plane of the hole. Cover the roots with about two or three inches of rich, loose ground and tramp thoroughly, then fill balance of hole without tramping. Thus the upper soil acts as a mulch. Vines planted in this manner the roots all run south, giving a chance to stick down a stake at the north side of the hole without touching any roots. Please allow me to stop right here and relate what I heard once at a State Horticultural Society. A young professor of an agricultural college was attempting to teach us how to grow grapes. If my memory serves me right, he said he did not stake the vines the first year, pinched no laterals but let the vine have its own course with the exception of cultivation; that he did not want them to commence bearing young. He then asked the venerable president of the society if he were not correct in his views. I first thought, young professor you have more theories stored up in your head than you ever had practice in the vineyard. But when that honorable old veteran nodded his head, I felt dumbfounded and wondered where I had been all my life, and what I had done. But after going home and thinking over my past experience of nearly thirty years, planting vines every year since and never having any vines damaged by bearing too young, and the many premiums I had taken at state and county fairs and always taking the reward of merit as to quality and size of clusters, I made up my mind these two gentlemen had more yet to learn about grapes as well as myself. Now back to my subject. After the vines have grown a few inches I again

concentrate forces by breaking off all shoots but the strongest one and tie this up to a stake as soon as long enough to tie, and tie two or three times during the season. Check laterals after they have made one leaf by pinching end off just beyond this leaf. Prune this young vine any time after the frost has cut the leaves up to the first of next February. At the height of eighteen inches, if the vine has made a growth as thick as a lead pencil, cut it off at that point and any that have not made as strong a growth cut back to three buds the same as when planted. Second year's pruning consists in removing all shoots except one strong one near the top of the eighteen inch vine. Pinch no laterals this year but keep the vine tied up to the stake during the season. The third year we are ready for the trellis. Use good sound white oak posts. End posts ought to be eight feet long and put in the ground with a post hole digger in a slanting position so that the top of the post will lean outward about a foot from perpendicular, and if a clay soil, will need no braces. In case braces are needed use No. 9 wire, running down from top of post outward and anchored in the ground with a rock. The other posts should be seven and one-half feet long and put two feet in the ground twenty feet apart. Use No. 12 galvanized wire. Place first wire three feet from ground, the other wire near the top of post. These are all the wires necessary to grow grapes by the Kniffen system, which is the best way to grow grapes. The small stakes can now be used for firewood. The vines this year, which is the third, should be cut long enough to reach the top wire providing the vines are as large as a pencil at that height. Always bear in mind to prune with reference to the strength of vine, leaving the most buds to the strongest vine, and never allow a vine to overbear; an overloaded vine does not produce good bearing wood that year for the next year's fruiting. All laterals should be cut off close to main cane with the exception of four, which are left near the wires for the purpose of running a bearing arm in opposite directions on each wire and these should be cut according to their strength, say one or two buds. The ground shoots and nearly always the shoots below the lower wire should be broken off each year early in the season. I do no summer pruning from this time on except to occasionally check a too rampant growth. The fourth year your vine will be large enough to bear a full crop.

The four bearing arms this year and the years following should be cut back to seven or nine buds and all laterals cut away, leaving nothing to bear grapes except these four arms. For you to expect a novice to prune exactly as I do would be absurd. I should want him in the vineyard with my pruning knife in his hand and cut the canes I dictate. I usually cultivate the vineyard with an Acme harrow and a double-shovel plow, never going very deep and keeping it about as clean as corn. Since commencing this paper it seems to me it would be a good plan to sow oats the last cultivation for a green carpet to set your baskets of grapes on while picking, and to serve as a ground covering during the winter. In regard to picking: Never commence to pick when they first color, as they taste then a little like the Champion which breaks down the grape trade, but let them hang till ripe to create a demand instead of glutting a market. Cut with a pair of scissors and remove all imperfect grapes from the cluster and pick the finest clusters first, handling carefully to retain the bloom and put your brand on each package of fancy grapes and use five and ten pound Climax baskets or some fancy package. If for a home market always heap up the basket, it looks so much better and never put the best on top and the poorest in the bottom, thus gain a reputation for producing the best fruit on the market. Handle what few are left, that are not fancy with almost the same care you do the choice grapes, but do not brand them. As to varieties I do not feel like advising. If I was only going to plant one variety of black it would be the Worden. If only one variety of red it would be the Brighton. If only one variety of white it would be the Niagara. But I must confess that I feel like pounding the Champion over the head every time an opportunity permits. We used to have some weak, narrow-minded horticulturists who recommended that variety. But I think they have all left civilization and gone to the Phillipines to grow up with the country. I once heard a horticulturist (who thinks he is quite high on the ladder) say at a horticultural meeting that he did not like the Champion himself but grew it because it brought him the dollars. This man loves the almighty dollar better than he does his fellow man. The principle to live and let live is a good one, but the man who kills his friend and neighbor by selling him Champion grapes does not possess

this principle to any marked degree. The Champion has a much younger brother, the Early Ohio, who is dangerously ill; before his illness he said to his elder brother, "Champion, let me help you in this grand and glorious scheme that I may become famous as well as you. Let us dress up in our Sunday best and go out on the market bright and early and completely disgust the grape eating public and not let them know there ever were any grapes like Green Mountain, Goethe, Brighton and many others, and teach them to buy foreign fruits and nuts." But the elder brother says, "my dear brother Ohio your stature is not as large as mine nor is your dress as elegant, otherwise you are pretty well qualified. But I do not think I would be honored in your company, besides I have almost accomplished the desired end and you better go home and keep quiet; I am the Champion." The consequence of this elder brother's rebuke was that the Early Ohio took seriously ill and all doctors of any repute say he never will recover.

The true and progressive horticulturist is always seeking for something better, something he likes, something everybody likes, something that will create a demand and not glut the market like the Champion grape. The introduction of this grape was a curse to the grape growers of this country.

PLANTING, CULTIVATING, TRELLISING, PACKING AND MARKETING OF GRAPES.

By C. F. Ruegsegger, St. Joseph, Mo.

1. Location and preparing ground. Grapes, like other fruits, prefer certain exposure and will reward the grower for selecting the most suitable exposure. Most varieties will do best on high land where late frosts are not as apt to damage them. Grapes will grow on most any soil. A south, southeast or east slope is preferable. Before planting the ground should be well plowed, and fertilized if necessary. Planting can be done by digging holes about ten by twelve inches square, or running a plow deep as possible. I prefer planting after a plow for it gives one a chance to spread the roots full length. Great care should be taken to get rows straight, for they will

be much easier worked for so many years to come more than paying for little extra time spent in getting them just so.

2. *Space.* There is considerable difference in ideas, and should be governed by the way of trimming and care, one can give his vineyard. As a matter of course a vineyard planted close will wear out the ground sooner than one planted farther. If the growers can and will fertilize his vineyard he will realize more per acre than by planting more distant. The time required to apply manure will not be any greater than the extra time required to cultivate the same amount of grapevines on a larger piece of land.

To draw a line on distance of planting, I would call four by seven feet close and seven by eight feet far. Six by seven feet is a good medium distance to plant with an occasional wider row to drive through, if same is desirable.

3. *Planting.* In most cases a strong one-year-old plant is preferable to a two-year-old or older. Trim plant shoots off except one and leave two or three eyes, as the best sprouts will grow from the crown of original cutting. Spread roots well, roots may be shortened a little just before planting. Get mellow topsoil to the roots, and tramp very light. A convenient number of plants should be carried along in a bucket of water, taking out one at a time, this will cause ground to stick to roots no watering required. It is well to set a small stick with each plant thus marking the row.

4. *Cultivation.* The first two years great care must be taken not to cover the young plants for they are very easy smothered or broken with a lump of dirt. After vines are older and stronger cultivating must be so done as to save hand labor. By covering the first crop of weeds with a turning or worn twelve-inch plow, next crop of weeds can be destroyed with cultivator or plowing away from row. The ridge left in the row must then be scraped down with the hoe. In this way grapes can be very cheaply cultivated. Great care should be taken not to go too deep on account of destroying too many roots. Some growers recommend clover in their vineyards. I have tried it but noticed my vines getting weaker and so I plowed clover up the second year.

5. Trellis. Posts and wire seem to be the most practical way of training grapes on in this section. From four to five vines between posts. Two wires are sufficient, distance from ground to first wire 26 inches from first to second wire 19 inches. No. 10 to 13 galvanized wire is the most practical, the heaviest wire being more expensive at the start, but cheaper in the long run.

6. Training and pruning. The first year after planting the young vines can be allowed to lay on the ground at will. With the first pruning we will start to train the vine. If the one stem system is desired leave the strongest cane about eighteen inches long, cutting all other sprouts off. Posts and one wire ought to be put in to support the second year's growth. Leave the three end sprouts grow so as to give you one cane for the top wire and two arms for the bottom wire. As practically all the wood for the third year is bearing wood, care must be taken not to let them overbear, do not expect more than a half crop. At the third pruning leave two canes on lower and two canes on upper wire, leaving six to eight eyes on a cane. In order to maintain that shape of vine it would be necessary to renew it, that is to leave a stub or spur back of each cane. A stub has three or four eyes and will bring the wood back to the old stock. After a vineyard is in such a form trimming is very easy, cutting off the branch or cane of the year before close to stub. Leave last sprout on the stub as cane for bearing and cut another stub nearer the stock. The nature of the growth in grapes will give you chance to prune year after year in this style with very few exceptions.

Another way of pruning is to trim back to two or three eyes. Let two sprouts grow the second year cut them long enough to reach the lower wire and let them bear the third summer. After that year add one or two canes which will give the vine a fan shape. The vine can be renewed same as the other with stubs at the lower wire. I prefer to have no foliage nearer the ground than eighteen inches, thus giving the wind a good chance to circulate which will keep the vines and fruit much healthier. Summer trimming is not very advisable here on account of hot midsummer causing fruit to be scalded if not sufficiently protected by foliage. I believe in heading or pinching off

the shoot in spring just as soon as bunches are visible, leaving one leaf after last bunch. This will throw all the sap in the bunches and develop better bloom.

7. Packing and marketing. In order to establish a good market for our grapes, more care should be taken not to pick green and inferior bunches. This practice will in course of time be a disadvantage to growers in general. It is advisable to go over the vineyard soon as part of the grapes are ripe and give the balance plenty time to mature.

DISCUSSION ON THE GRAPE.

Mr. Karnes.—What is known of Campbell's Early grape?

Mr. Baxter, Nauvoo Illinois.—It is not hardy in such a winter as the past. It did not stand any better than Moore's Early, which were three-fourths killed, but the fruit is very nice. It is not as large as Moore's Early, but of better quality. The cold weather killed my vines.

J. C. Evans.—At the meeting of the American Pomological Society in Philadelphia last September there was the finest show of grapes I ever looked at. Campbell's Early was the best grape in the collection, all things considered.

Maj. Holsinger.—There are a great many fruits which do well on the eastern coast which are of no value here. Is the Campbell sufficiently early to be worth planting here? Two of my friends who have tried it say it has no quality for profit over Moore's Early. I fear it will prove to be like the Early Ohio, not profitable. Some one said that Campbell's lived in Colorado last winter and made a splendid growth this year.

A Member.—The Hicks lived through the winter and made a good growth this year. I have not fruited it.

Maj. Holsinger.—My Hicks killed to the ground.

L. A. Goodman.—Last winter is not a fair test of a grape's hardiness. Campbell's Early is at least worthy of a fair test by all grape growers. It is early, a good keeper and a good shipper. At Philadelphia it was one of the very best.

Mr. Murray.—Has the McPike been fruited in Missouri? (No answer.)

Mr. Irvine.—What is the best late red, late black and late white grape?

L. A. Goodman.—Goethe is the best late red grape.

Maj. Holsinger.—My Goethe were killed to the ground. Wyoming Red came off with flying colors. It is one of the best reds. The Goethe is rather a white grape, even if it were hardy. The Concord came through all right.

E. J. Baxter.—Wyoming is very inferior in quality, neither is it late. Vergennes is a good late red grape. Worden is not as hardy as the Goethe. I would say Vergennes for red and Concord for black.

Mr. Callaway, of Illinois.—The Hosford is the largest black grape I have. It ripens with the Concord and is of similar flavor. It passed the winter safely.

J. T. Snodgrass.—I have the Hosford from Kellogg of Michigan. It wintered very well. I do not like it. It is irregular in ripening, not of good flavor, a little later than the Concord. For a black grape give me the Concord.

Mr. Wilcox.—What of the Colerain?

Mr. Murray.—It is good, hardy, small, not a commercial grape; good for the family.

Mr. Baxter.—Moore's Diamond is hardy, prolific, of good quality and does well. There is no great demand for white grapes in the market. I like Niagara better than anything else in the white grape line.

Mr. Butterfield.—I would like to speak a good word for our fruit papers, the Western Fruit Grower and the South West. They are valuable to all horticulturists, especially new ones.

Mr. Murray.—We want to build up our western horticultural literature. Many of the eastern papers are all right at home, but very often misleading here.

SPRAY PUMPS.

Prof. Whitten showed a Gould's barrel spray pump which the manufacturer had sent prepaid to the meeting for the purpose. He said it was a good pump, but not the only good pump.

The Dewey nozzle was recommended by Mr. Baxter and others as the best nozzle he had used. Mr. Murray said that the Eclipse was the only pump he had ever used, that a fifteen year old boy could use all day with two lines of hose.

DRY SPRAYING.

J. J. Kiser showed a dust blower which he claimed to be far better for fighting insects than water solutions. He mixed the Paris green or other insecticide with dry slacked lime. The machine worked with a bellows.

Prof. Stedman said the machine was a good one for the price, but he preferred the Leggett powder gun which worked with a rotary fan. He thought that on the whole the water sprays would be more efficient than the dust sprays, and thought that dry lime would not neutralize the corrosive property of Paris green. Dry lime and powdered copper sulphate would not make Bordeaux mixture.

L. A. Goodman and others spoke of the great labor of spraying with water mixtures, and hoped the scientists would devise ways of using insecticides and fungicides in fine powder. In some of our large orchards it is hard to get water and haul it over the hills on which some orchards are planted.

Prof. Stedman said that at the station they had found dry lime alone to be a good thing to dust on the trees. It drives away a great many insects. Dry Bordeaux mixture must be first made in water and then the water be evaporated and the mixture powdered. It is made by one firm and offered for sale. He cautioned those who used poisons in dry powder to be careful in handling them and not to breathe the dust.

SEVENTH SESSION.—Thursday Evening.

At the opening of the meeting, J. F. Wilcox, of St. Joseph presented the resolution printed below and it was heartily indorsed.

RESOLUTION ON PROTECTION OF BIRDS.

Whereas, the wanton destruction of insect destroying birds has become so extensive and general as to menace the fruit growing interest of Missouri, therefore;

Resolved, that it is the sense of the Missouri State Horticultural Society that we are seriously in need of a statutory law that will protect them from this wanton destruction.

DISCUSSION.

L. A. Goodman.—If there are some friends of the fruit grower better than others they are the birds. The absolute destruction of so many pretty birds is deplorable. I am sorry that our present law places the meadow lark among the game birds and allows it to be shot. It is an outrage upon our civilization to call this a game bird. Its crop will be found full of insects. It is one of the best destroyers of our insect pests. How many times have you and I been angry at the men and boys who pass over our lands and kill the birds. I call your attention to one locality in which the birds have the same protection as the trees. Every one of the birds are among our best friends. If we allow them to be killed we will have lots of trouble with our insect enemies.

J. C. Evans.—I sympathize with any resolution looking to the protection of the birds. We are spending thousands of dollars in fighting insects which would not be necessary if we had the birds. I know of no way to protect them except through the legislature, and that is a long road. No matter what bill you introduce you will always find men there to fight it. If you do start anything of this kind you must follow it up and take it in charge when the law is passed.

Maj. Holsinger.—I think the ladies are largely responsible for the killing of the birds. Look at these hats! If we are to succeed in preventing the killing of the birds we must keep the ladies from wearing them on their hats. It is not very consistent to pass a resolution

for the protection of the birds while so many are killed to be worn on the ladies' hats.

Rev. Gilliam made the motion on the part of the citizens of Princeton, that they are in full accord with the resolution adopted. The motion was heartily approved.

ORCHARD MANAGEMENT. By W. T. Flournoy, Marionville, Missouri.

Mr. Goodman:

Sometime about the last of October, I received a letter from you, asking me to write an article for the Princeton meeting, on "Winter Killing of Orchards, Their Care, etc., etc." A week later I received another letter, adding "Orchard Management;" "Benefits of Spraying, etc." I can only relate some of the things that I have observed during my short experience as an orchardist. I do not think there is a rule that will work in all places alike, further than to keep trees healthy at all times, and by all means, do not neglect to give them the best possible advantage after a severe damage has taken place, like the freeze of last February. In order to counteract the damage done in last winter's freeze, First. We commenced to spray in the usual way, except the use of sulphur in the mixture.

Second. Between the first and second spraying, we whitewashed the trees, with a preparation of lime, sulphur and salt, to keep borers and other insects from attacking the trees during spring and summer, while they were weak from the hard freeze. I used sulphur, because, in my experience I had found it good, which is contrary to the experience of some of our state experimenters. Whether I am right or not can be determined by the examination of other orchards in this vicinity, not so treated.

Third. I cultivated until midsummer, about August 1st. Part of the time I have not done all work as thoroughly as I believed it needed, and afterwards I felt like I had made a bad mistake by not so doing.

We have always pruned a great deal, but not just for the sake of cutting the trees. We thought we were doing it in a good cause, therefore, when the trees were weakened by the freeze, we did not add

to their weakness by additional cutting. The trees had been pruned heavily in December, 1897, and January, 1898, enough to let them rest awhile. The last treatment is somewhat contrary to the teachings of a few horticulturists who have said, "cut back frozen trees."

With peach trees, I practice cutting back slightly when they freeze and have had success, but my peach growing is very limited.

With one or two varieties of apples the damage was great, but the trees living November 1st, were green with foliage and I have no fears but what they, as well as other varieties in my orchards will stand another freeze as well, or better, than other orchards of same varieties in my vicinity.

Soon after the freeze last winter, I feared that I had lost all the crop for this year, with heavy loss and damage to trees, but this fall I find that I had an average of one fourth crop, good fruit on all ages of trees, with very little damage to trees. The damage to the crop varied on trees of different ages. The crop was damaged less on the older trees, and the damage to trees was, also, less on the older ones.

My orchards are not entirely free from borers, for in looking for the effects of our treatment, I have found three or four during the summer and fall. I have only found them in a few of the trees that had damaged places on them of two or three years standing, where there was rotten wood, but in no sound tree have I found a single borer, except trees not washed with the sulphur and lime.

I commenced to work in the spring on the theory that borers and other insects attack more readily trees that have been damaged by winter freezes than those not so damaged, therefore, are more apt to do harm the summer following a damaging freeze than one following a mild, even winter. A tree might die after being perforated by borers, when the real cause of borers was the damaged condition of the otherwise healthy tree by the hard freeze of the preceding winter. I think it possible that the tree, having its inner layers of bark damaged by a freeze may give off an odor during the spring and summer following that attracts the insect which lays the egg that afterwards hatches out a borer. Spraying is necessary to combat the evils following a hard freeze, as a tree can not be healthy without a good, strong, undamaged foliage. I will say further, in regard to the use of sul-

phur, that I commenced the use of it on my orchards the second fall after I planted my first orchard, by mixing it with beef's blood procured at slaughter houses. The blood was rubbed on the trees in September and January, to keep rabbits from gnawing them. The sulphur was put in then, because it was a convenient time, and the blood made it adhere to the trees. I was not troubled, at all, by borers while that treatment was followed, which was about five years, as I remember. By that time the trees had grown too large to be injured by rabbits.

During the next three or four years, between the time I quit the use of blood and sulphur and the time I commenced to spray, I was troubled very much by borers in some localities in the orchards. After spraying was commenced, I had but little more trouble with borers, so little that I rarely looked for them and when I did, I seldom found any.

Later I have been led to believe that borers will rarely attack a tree if it is kept in a healthy growing condition. The coat of white lime on the tree, I believe, in a great measure, keeps insects away.

My neighbors whom I have persuaded to try the blood and sulphur report no damage from borers or rabbits after using it.

In experimenting with the mixing of lime and sulphur we found that we got a little better combination of the two, by putting a barrel of lime in the slaking box, adding enough water to slake, and just as the bubbling ceased and the heat was greatest, we added a half bushel of the flour of sulphur after rubbing it through a seive. It is easier to mix while the solution is yet thick. After mixing thoroughly, we put in water enough to make, in all, one hundred and sixty gallons, then put it into the spray tank, and applied to the trees with the pump, the gage showing a pressure of forty to sixty pounds. We use the "Boss Nozzle," and for this purpose, use the round orifice. Sometimes I added twenty-five or thirty pounds of salt to this mixture, and again I did not, for I felt like it was useless.

This is the only year in which I have used the sulphur and lime combination, in place of lime alone, in making Bordeaux mixture and used it for the first spraying only, which was just before the blossoms opened. We find that spraying with Bordeaux, with sulphur added, is very hard on some of the men who use it, while it does not hurt others

It is hard on teams, also. Care should be taken, as it is worse than lime alone on the skin. I will use it only in years in which I have had severe injury to the trees. We sprayed second time just as the last of the bloom was ready to fall, but was yet hanging on the trees. Our solution was twelve pounds of bluestone; eighteen pounds of lime; one pound of Paris green to one hundred and sixty gallons of water. I have used more bluestone, but found it too much in former years. I spray once or twice more, depending upon the amount of rains we have, and the appearance of the foliage and fruit. Men have asked me to let them know when I was going to spray for they wanted to be present. I tell them it is almost impossible, for we will commence spraying, possibly, at times within fifteen or twenty-five minutes after we see it is necessary. We use a spraying machine, that I think, is somewhat like the kind used on the Olden Fruit Farm. It is built on an ordinary farm wagon, to which we work four horses, abreast. The front wheels are small, which enables us to turn short. We spray thoroughly from one to three thousand trees daily. After all spraying is over, we harrow the ground with springtooth harrows, or if it is too dry or weedy, we use ordinary two-horse cultivators in the oldest orchards, while in the younger ones, we break the ground with turning plows. The tree roots are not to be torn up in the young orchards by deeper plowing, as they would be in older ones. Later we may keep the ground loose with "weeders," for some time, but if the ground gets too hard to do good work with them, we put the harrow back to work again. We keep this up until the first of August. We plow close to the trees with double-shovel plows, keeping the trees pruned, so that a small horse or mule can walk within two to four feet of the tree trunk. The plow is fastened to a chain and let back from the singletree three or three and a half feet.

There is one orchard in my vicinity that is not cultivated that bears a good crop nearly every year, of better than average fruit; that is not sprayed; it matures its fruit with fine color two weeks ahead of my orchards, as do all other orchards similarly treated. When orchardists can retain dense, healthy foliage on their trees until frost bites it, causing the foliage to fall, and at the same time causing the fruit to color then can they furnish the packers with firm, well flavored,

crisp, first class fruit, on and after the fifteenth of October, in this latitude; fruit that matures too early will not last long through moderately warm weather, such as we had in October this year, to reach the storage houses, and we hear the cry later from commission men on Water street, Chicago, and elsewhere, that their fruit is rotting.

It has occurred to me that old settlers planted their orchards altogether in new fresh lands for the good reason that they had no worn out land, therefore, their trees were more apt to get a healthy start and made longer lived trees.

I have seen more cases of root-rot in wet, clammy, worn out land, where the wind had a fair chance to shake them about when the ground was wet, causing a crust to brake hard around each root when the ground dried out, similar to a coat of plaster of Paris, which helped to kill the tree in the poverty stricken soil. In such soils the cow pea assisted in a mechanical way, as well as otherwise, to restore such soils to a normal condition for tree growth. I drill the cow peas, in each orchard, after the first of June, after I find out there will be none, or a very light crop on such orchard. The peas are cultivated as long as we can get through them, first with weeders, afterward with cultivators. From June 15th, to July 1st, we thin the fruit if our crop is too full, by taking off all small and damaged fruit; thin out all clusters to one apple, and places where fruit is too thick, to five or six inches apart.

I have seen very little damage occur to apples after July 1st, unless by hail or grass-hoppers. I have found it best to fertilize the trees with manure during the first five or six years, afterwards with cow peas.

When a tree dies from any cause, I reset the next spring and by continued cultivation, the tree grows as thrifty as if in a cultivated orchard of its own age. If the tree was set out in sod, in an older orchard no doubt its growth would be unsatisfactory and the tree would probably die. I find that hard-pan patches cause trees to die, and it is uncertain whether trees reset on such ground will live or not. It is rather hard to get trees to grow in wet places, but after being started two or three years, they do as well, or better, than trees set in more

favorable places. Trees grow larger and look nicer in red lands, but I like the whitish, yellowish and black clay soils best for they appear to grow nicer fruit, and the fruit does not mature so early in the fall. I think the trees bear better in such soils.

I have one orchard that was set out first in 1885. We sowed the land in oats and clover the same year. The orchard consisted of five hundred Ben Davis, two hundred and fifty-six Winesaps and Huntsman, seven hundred and fifty-six trees, in all. We cut the crop of clover in 1886. In the spring of 1887, we plowed the land for corn and reset five hundred of the trees that had died. We continued to cultivate the orchard and reset each spring. In 1892 we sold \$50.50, worth of wormy, scabby apples. In 1895 we got a spraying machine and commenced to use it the best we knew how. My crop in the fall was much better than I expected. I received something over \$650 for the crop and it was sold very cheap, for I had had no experience in selling fruit. In the bad year of 1896, I raised seven hundred barrels and sold for \$850, and estimated that I had cleared \$650, after paying all expenses of raising, spraying and handling. In 1897, this orchard set very full of fruit and had to be thinned a great deal. We cultivated some, but not enough. The crop sold for \$2,000 on the trees, which was about equal to \$1.50 per barrel. In 1898, we had only a light crop and most of it was blown off during a storm in July. In 1899, Three hundred and sixty Ben Davis trees, in this orchard, bore seven hundred and thirty barrels of apples, five hundred and ninety of which were hand-picked. My loss in sorting and packing of hand-picked fruit, was about one barrel in sixty. The hand-picked fruit sold at \$1.85 per barrel, while the best of the wind-falls brought \$1.25 per barrel. The evaporator stock sold at about sixty-nine cents per barrel. Adding the balance of the sales of Huntsman and Winesap, we received, in all, for the year, on the seven hundred and fifty-six places for trees \$1,500. The total sales from this orchard for five years, beginning with 1895 and including 1899, was a little over \$5,000, and the cost has been about \$600, for all cultivating, spraying and pruning during the time. This orchard of 756 trees is the oldest one of my several orchards. I mention it particularly, because it being the oldest one, has given me most experience. The trees in this

orchard are set twenty-five feet each way, and this winter we are going to pull out each alternate row diagonally, thereby leaving the trees a little over thirty-four feet apart, each way, which I consider full close for trees of their size and age. The balance of my orchards are set at greater distances, for we had learned by experience that twenty-five feet was entirely too close. It seems to me the best thing to do is to follow the directions of our State Experiment Stations, and successful fruit growers study local conditions, and different soils; for different orchards may require slight variations in treatment.

I would prefer healthy trees to withstand any kind of reverse, to stunted ones. I would rather have a thrifty orchard, after it had been killed by a hard winter, to a stunted one after it had lived through it. It is easier now, for us to see that it is cheaper to raise good apples than poor ones, even at same price per barrel, as the yield is so much greater, with the better treatment required to grow good ones. However, the good apples always command a better price. Time was when the United States Weather Bureau did not give satisfactory forecasts, but now they are much better. It would be much to our advantage, if we could get the forecast each day, for we can ill afford to start on a days campaign in the orchards, without taking the weather forecasts into consideration.

ORNAMENTAL TREES AND PLANTS.—By H. R. Wayman, Alvord, Missouri.

It would be useless for me to discuss this subject before this intelligent audience, except to point out a few things gleaned in the past thirty years by propagating and handling nursery stock in a small way. But little can be done in the way of adornment with trees and plants in a closely built city. The limited space of ground will not allow the full effect of landscape gardening as compared to the country seat of from five to fifty acres.

The impatience of our people as a rule will not permit of beginning at the foundation for the most perfect, beautiful and lasting improvement of this kind; a man builds a fine house close to the highway, orders from the nursery or the river bottom the largest shade and ever-

green trees he can procure to set in his front yard (he don't plant anything on the back yard), he thinks he must have something to make a show and it certainly does make a show of very poor judgment; ornamental trees should make nearly all their growth on the grounds where they are to remain, many shade trees should be started from the seed on the grounds; evergreens can not be successfully grown here from seed, but can safely be transplanted from the nursery row, if not too large. For ornamental hedges, I prefer American Arborvitae. It can be pruned to any size or shape. The Scotch, Austrain and White Pine, Red Cedar and American Arborvitae make the most effective and lasting wind break and shelter belts for stock. Weeping Elm, Catalpa, Sugar-tree and Transcendent Crab are among the many very desirable trees for shade. Mountain Ash, Weeping Willow, Irish and Trailing Juniper, Norway Spruce, Balsam Fir and Weeping Birch are some of the leading trees to adorn the lawn and grounds. Peónas, Phlox, Yucas or Bed Plant, are hardy perennials. Lilac, Spirea, Japan Quince, Snow Ball should be represented, but plant very sparingly of anything of deciduous and brushy nature. Do not neglect the climbing plants. Wisteria, Clematis, Virginia Creeper, Honeysuckle and often a grape vine or two will give a very natural and graceful effect. Grounds thoughtfully marked out, judiciously planted, thoroughly cared for, will be beautiful and can be made with little cost in cash, but require considerable patience, some labor and a thoughtful mind.

"Strength may wield the ponderous spade—
May turn the clod and wheel the compost home—
But elegance, chief grace the garden shows
And most attractive is the fair result of thought
The creature of a polished mind.

Vocal Solo.—Mrs. Arthur Anderson.

WHY OUR TREES ARE SHORT LIVED.—Prof. J. C. Whitten. Columbia, Missouri.

A consideration of short lived trees falls under two heads; trees that belong to short lived families or varieties, and those that are so treated, as individuals that they can not live long. I had a friend in Iowa, his father lived to be ninety years old, though he used tobacco excessively all his life. His great age was traceable to the fact that he

belonged to a long lived family; not to the fact that he used tobacco. I know another man in Illinois, who comes of a family of consumptives. Realizing his danger from this malady, he has all his life taken morning walks and regular exercise in the open air. He still lives; at the age of nearly ninety. His continued good health is due to his systematic habits of life, the regular care he has given his body. These cases illustrate the two standpoints from which we may consider the longevity of our trees.

It has been claimed that our apple trees in the west are short lived. I am not prepared to dispute this statement. Their short life may be no doubt partly due to the fact that we are in a new country, and have not yet had time to adapt our trees to longevity in this climate by originating and acclimatizing varieties. We are depending mainly upon varieties originated elsewhere. Those sorts which are the longest lived under other climatic conditions might not be long lived here, just as our commercial varieties, so large and productive here are not large and productive in some other orchard regions. In a trip to southeast Missouri this summer I saw some apple trees that were seventy years old and as large and productive as any I have ever seen. This indicates that some varieties are long lived in Missouri.

The demand for early bearing varieties has been greater than the demand for long lived ones. With the hurry for wealth, and constant rapid change which characterizes our western conditions, men plant Ben Davis, Missouri Pippin and Jonathan, which come into profitable bearing at from three to five years, without stopping to inquire whether some other, later maturing sort might be in its period of most profitable fruiting after these early bearing sorts are dead and gone. It is quite probable that there are in existence many sorts that would outlive the varieties commonly planted here, and it is possible that some of these varieties would be commercially profitable if we cared to wait ten or twenty years for them to come into their best fruiting period. On the Experiment Station grounds there are numerous varieties that have grown for ten to twenty years without giving any evidence of fruitfulness. Every year we are surprised by some of these sorts suddenly beginning to bear and I shall not be amazed if many of them prove to produce to a good old age.

While admitting that our orchards are short lived, records have not yet been presented to convince me that seventy Ben Davis apple trees planted twenty-five by twenty-five feet apart on an acre of Missouri land will not produce during their lifetime of thirty or thirty-five years as much fruit as will twenty-seven trees of Baldwin or Spy planted forty by forty feet apart on an acre of eastern land during their longer lifetime of fifty years.

If the fruit from a Missouri orchard during a single year will sell for more than the whole farm is worth (as I have known to occur in hundreds of cases) without seriously weakening the trees, I do not know that long lived trees are essential to our prosperity. The growers of fat live stock find it more profitable to force a very rapid growth on their animals and market them at a younger age than formerly. I believe we have gained a similar point of profit by growing our early bearing, heavy producing apple trees, that accomplish their life work of productiveness in a shorter time and then give way to another set of young, vigorous trees of manageable size. Compact, low headed, early bearing, prolific western trees, set thickly on the ground certainly favor our getting the largest amount of fruit in the shortest period of time, and they are also much more easily managed.

The best treatment to give the individual tree in order to secure productiveness and longevity is, in my opinion, of more importance than a consideration of long lived varieties. If there is any one point in this regard that should be especially mentioned it is the need of continual, uniform care of the trees. Give the trees uniform treatment every year, whether they are carrying a full crop of fruit or not. The neglected orchard that is suddenly plowed in midsummer may be injured as much as it is helped by the operation. To neglect to prune until the trees are overgrown with sprouts, and then to thin these out excessively may do more harm than no pruning. To neglect cultivation because there is only a light crop, and allow the trees to struggle along to recover from previous heavy bearing is unwise.

If the Missouri orchardist will plant on fairly well drained land, cultivate his trees as he would his corn, occasionally plow in a crop of cow peas (or other winter cover crop) between the rows, prune just enough to keep his trees symmetrical, keep off rabbits and borers with

wrappers, spray intelligently for leaf insects and fungi, when necessary, and keep his trees from overbearing by thinning the fruit, he can produce apples that will many times repay him for all this attention. Much of the cry of short life of our trees is due to neglect of the above essentials.

Vocal Solo.—Mrs. Martin Read.

RESOLUTIONS.

To the Officers and Members of the Society:

Your committee on final resolutions beg to report as follows:

Resolved, That the Missouri State Horticultural Society greatly appreciates the efforts of the members of the Mercer county Horticultural Society and the people of Princeton generally to entertain this meeting. To the various persons who have furnished music and literary numbers, our thanks are due, especially to the K. of P. band, the ladies who contributed songs and recitations and the male quartette for their selections.

Resolved, That we are under obligations to the press of this and other cities for their courtesy during the meeting and throughout the past year.

Resolved, That this society thank the executive committee of this organization and ratify their action in collecting fruits for the Paris Exposition. The entire State should assist in this work of advertising the resources of the State. We also commend the efforts now being made to arouse an interest in the exhibits desired to be made at Buffalo in 1901 and St. Louis in 1903.

Resolved, That we appreciate the work of the Department of Agriculture in investigating the subject of root-rot in this section, and that we urge the members to assist the department in this work.

N. O. BOOTH,

R. A. EMERSON,

JAMES M. IRVINE.

Committee.

RESOLUTION ON PURE FOOD—ADOPTED.

1
Whereas the Missouri State Horticultural Society believes that every purchaser, when he pays his money for an article, is entitled to know what he is getting, and

Whereas the practice of false branding and adulterating of foods and drugs is becoming alarmingly prevalent, and

Whereas there is a body known as the National Pure Food and Drug Congress, composed of delegates from the various national and local organizations, from all parts of the United States, who are interested in the production and consumption of food and drug products; therefore,

Resolved, That the Missouri State Horticultural Society does most heartily indorse this movement for the prevention of the adulteration and misbranding of foods and drugs, and that they respectfully urge upon the Honorable Senators and Representatives of the State of Missouri, in the Congress of the United States, that they use their best efforts to secure of the Pure Food Bill, which is indorsed by the National Pure Food and Drug Congress, and is known as the Brosius bill.

Resolved, further, That a copy of these resolutions be sent to the Senators, Cockrell and Vest, and to the various members of Congress in the State; to the Hon. Joseph Blackburn, Columbus, Ohio, President of the National Pure Food and Drug Congress, and to Emerson Taylor Abbott, Vice-president for the State of Missouri, and that said Abbott be requested to express to the members of the Pure Food and Drug Congress, at its next meeting, the heartfelt sympathy and good will of this society.

RESOLUTIONS APPRECIATIVE OF THE SOCIETY'S WORK.

Whereas, The meeting of the Missouri State Horticultural Society, just closed in our city, has awakened a lively interest in the method and management of fruit growing heretofore so little understood by us: With a just appreciation of their unselfish, painstaking, earnest, intelligent devotion to the highest development of that most important branch of human industry, horticulture.

Therefore, in behalf of the Horticultural Society of Mercer County, and the citizens of Princeton:

Resolved, That we have been encouraged by their example, elevated by their suave social manners, educated by their teaching, made more generous by their unselfishness, and more ambitious for the future by their accomplishments:

And that in the parting we extend them our thanks for their visit, our highest good wishes for their future, expressing the hope that they will again visit us at the earliest time consistent with their duties, and a fair distribution of their favors to other parts of our Grand Commonwealth.

Resolved, that these resolutions be furnished the secretary of the State Horticultural Society for such use as they may deem proper.

This resolution was heartily adopted by the large audience present.



BLACKBERRY PLANTATION OF THE OZARK ORCHARD CO., GOODMAN, MO.



APPLE ORCHARD OF THE OZARK ORCHARD CO., GOODMAN, MO. TREES 4 YEARS OLD.

FAREWELL WORDS.

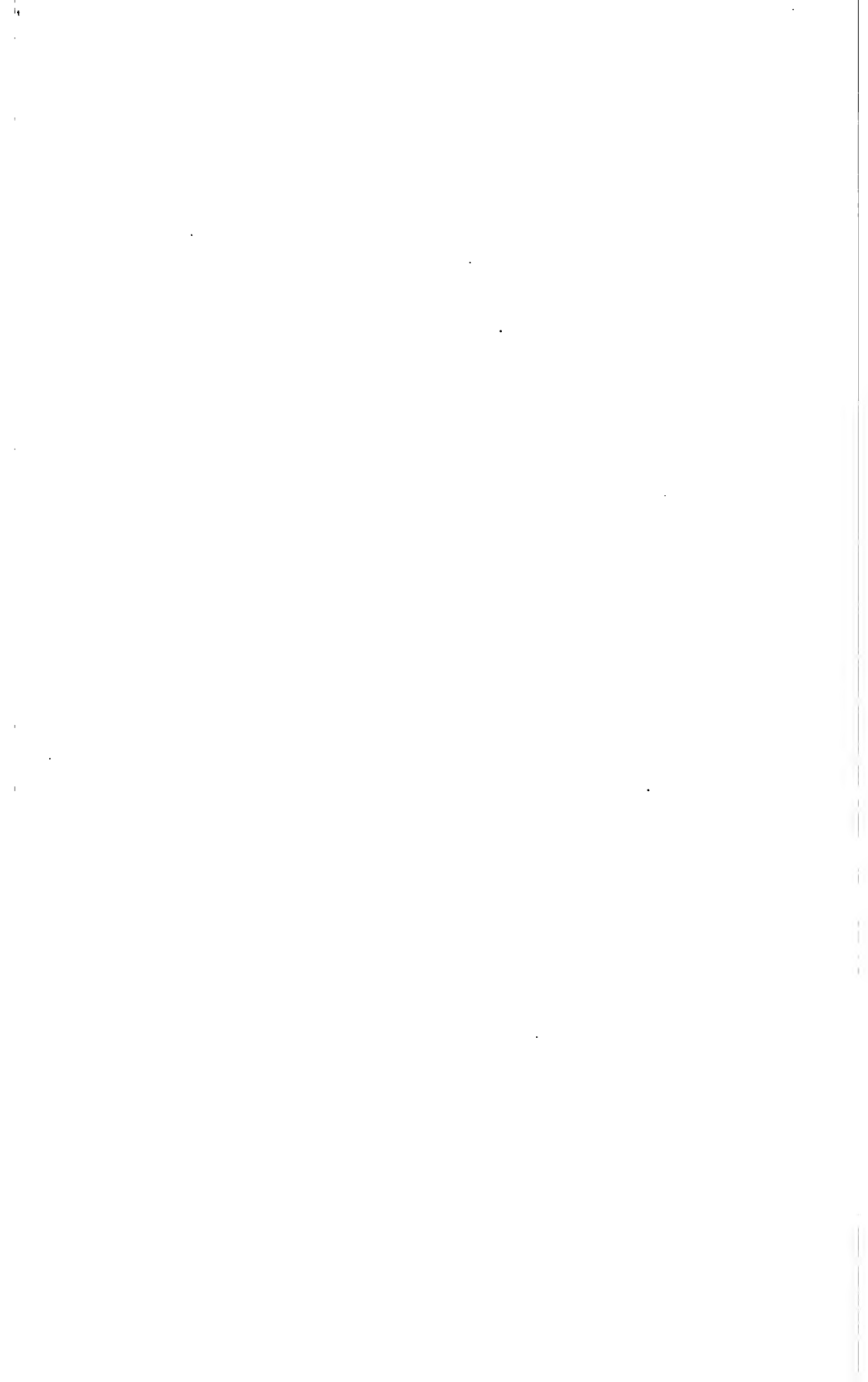
Pres. Murray.—We are now come to the last word. We feel flattered by the resolution you have just passed. We certainly thank you for the manner in which you have received, met with, and entertained us, and for the music of the band, the quartette, and the ladies. We shall go away feeling this to be one of the most pleasant meetings we have ever held. I congratulate you upon the progress you have made since I organized your county society here two years ago. It will pay you to keep up your society. I hope after this meeting, ladies and gentlemen, that you will feel a greater interest in beautifying your homes and caring for your orchards and fruit gardens. If you do this we will feel that our meeting here has not been in vain. We trust to have the pleasure of meeting with you again. I will close by calling upon others for a few words.

L. A. Goodman.—It certainly has been a very favorable meeting for the society and those interested. I heard one man say that he had received ten times the cost of his coming to this meeting. You will find the horticulturist the most liberal man you ever met, glad to tell others what he has learned himself. I have enjoyed this meeting. I am glad I came. We go with the feeling of having had a pleasant and profitable time with a pleasant people.

J. C. Evans.—I move we now adjourn sine die.

On motion the society adjourned, and marched to the banquet hall escorted by the Knights of Pythias band, and many of the citizens of Princeton. At the hall the entertainment consisted of music and short addresses by citizens and society men, followed by refreshments of cake, nuts, fruits, and fresh cider.

MISCELLANEOUS PAPERS.



MISCELLANEOUS PAPERS.

RECIPROCITY.

By L. A. Goodman, Westport, Mo.

Reciprocity for a horticulturist to write upon! What has this to do with fruit growing? Surely no politics are wanted and none shall be given, only such as treats directly with the fruit man and his trees, his care of them, and the reciprocity of nature to her children and of the Missouri and Kansas fruit growers to each other in mutual exchange of their knowledge.

When we come to examine the word closely we do not fail to find it one of the greatest factors and powers in our civilization. No part or parcel of the great business transactions could or would take place unless each observed the main principles of "Reciprocity." No farmer could sow his seed if the earth and nature did not reciprocate for the tilling of her soil. No horticulturist would plant a tree, bush, or vine was he not sure that Dame Nature would reciprocate.

No home can be a happy one unless there is reciprocity in the hearts of its members, nor a successful one unless this principle actuates father, mother, brothers and sisters to earn and care for what is earned and spend it for the advantage of all.

In our social life, what would it be were not our friends reciprocating every day with their favors, their demands, their troubles, their joys, and their visits?

How soon, think you, would one of you give favors, assistance, social visits, if your neighbor never responded or returned them, or appreciated your favors. Reciprocity runs all through our every day life and we can not get rid of it if we would.

In business, how still more is this reciprocity of interest made manifest. Not the simple and vulgar idea, "you tickle me and I will tickle you," but the greater and more important principle of "no one man can succeed by himself alone;" reciprocity must come from all with whom he deals and then the best of success comes to that business; that of satisfaction in its success.

In our states it must be the ruling factor. No state can say, I have no need of thee, but favors granted by one are returned by another and thus even the state lines are simply imaginary lines. Let but one state refuse to reciprocate and see how soon the others will let her alone and how soon affairs would become badly entangled.

"There is no freedom without law" and the best pleasures and successes of every person and every state even comes to those who reciprocate in like favors. Empires, kingdoms, principalities, republics, all nations know full well the import and principal of reciprocity in all their dealings with each other; how the best use of this principle will make both parties richer, better, happier, and hence it becomes the great aim of nations to use it to their best advantage and to the upbuilding of their country.

From individuals, cities, states, nations, even to nature in all her moods we find a response to favors shown her. Even the winds and waters and storms will reciprocate when properly handled and harnessed and we find them doing our work and giving us assistance when we use them aright.

Going one step higher, we find reciprocity a civilizer, an improver, a developer, a feature that will improve every person and community and people which makes use of it. It makes us regard the views and opinions and rights of others and that is the best civilizer or our people. It is an educator in that it causes us to respect others, and where we begin to think of others and study them and give them our ideas we are sure to have them reciprocate and return to us in kind. This, then, is an educator in the highest sense of the term.

Reciprocity is a money maker and that usually, for all parties concerned, because each gets that which he wants and gets rid of that which he does not want. Thus far with each other we can use it every day. It becomes then a culturist because it cultivates each one of us in mind

and body, in every day life, in business, in the home, socially and financially. Again it follows its best influences until it becomes a religion. Our hearts and minds and souls are led by this same great principle. Even God himself hath promised that "he that honoreth Me I will honor," "he that cometh unto Me I will in no wise cast out." There is no one great department of thought, or work, or study or feature of life where reciprocity will so quickly and so truly be known as in religion. God says "Test Me and try Me and see if I am not God."

The horticulturist above all others believes in reciprocity and applies its principles practically to every one of his dealings with nature, first with his trees and plants, and next with his fellow man. No class of business men, and certainly no class of professional men are so free with their trade secrets or their successful experiences as are the fruit growers. No sooner does a man make a success of or in one department of his work or with one of his fruits, than at once he tells it to his fellow man and in return gets other information he is seeking.

But the horticulturist also gives practical proof of the value of reciprocity in his every day dealings with his trees, vines and plants. First in the nursery how the little seedlings, and grafts and plants and trees, reciprocate for every care and attention, in cultivation, in hoeing, in training, that the husbandman gives his live plants.

How often we forget that all these trees and plants are alive, live beings, live trees, that they can feel and see, and love care and attention just as much as can any animal in our service. Did it ever occur to you how appreciative are our domestic animals to our care? Well, just so are our trees and plants; they are just as sensitive to care or neglect, to to attention or carelessness, to love or abuse as our animals, and they show it just as quickly. How they will reciprocate for every care given them. Ask or examine the plants of the florist and they will answer you. Go to the orchard and ask those trees how they will reciprocate if you will give them care and attention and training and see how soon they will answer you in their appearance, in their growth, in their vigor, in their fruitfulness. I believe that there are times when our plants will pay for every care, and for all the work bestowed upon them in their young life, by the return of fruits in their season.

In many ways might I outline how reciprocity works to the advantage of the horticulturist. Instances, State Agricultural Colleges, how they are working out the science of horticulture, how the fruit growers are aiding them in their work and how freely these facts and ideas are exchanged. The Experiment Stations, what a wonderful fund of information they are exchanging with each other day by day, and not only with each other, but with all the world. How gladly nature also responds to all their work if done according to her laws.

You never get a response nor a fact from any of these, that to make a tree hardy, graft the apple on the sycamore, the pear on oak, the peach on the willow, the plum on the hackberry, or the cherry on maple. You will not get the tree strawberry nor the evergreen raspberry, which gives a crop for six months of the year, every month a crop. Nor the thornless blackberry as large as plums, more hardy and productive than the Snyder.

Our colleges and stations, our fruit growers, and even dame nature will not reciprocate for any favors in any such manner as this. But she will reciprocate gladly if you attempt, according to her laws, to breed a hardy fruit or improve one by careful selection.

The depart of agriculture and the weather service. How gladly they will respond for any favors. For the fruit grower a great advantage not one-half appreciated or made use of. Only send in your reports regularly and see how quickly they will respond. Call for the weather report and your town may have them each morning, and know what the day will be. Over and over, day by day, week by week, month by month these scraps or items of information are being collected from our United States Station, our colleges, our Experiment Stations, our fruit growers and given out with a free hand to all, not only who help, but to all the land.

Did you ever go through an orchard where every tree and branch and twig and leaf seemed to plead to you for love, or cultivation, or dressing or, perhaps, even a washing, such as a dirty boy sometimes gets? Did you ever see an orchard which was skinned and scarred and bruised on body and branch by the careless husbandman, and did it not occur to you that some of the bark should be taken off the man's legs and less off the trees. Surely such trees will reciprocate in the returns that they give for sure care. The old saying is still true "whatsoever a man soweth, that will

he also reap." I wish to drop a hint just here. Is it not possible that this spraying of our trees does not do more good because of its cleansing properties than any other advantage gained. Does not the tree delight in being washed with some cleansing wash like lime and soap and lye, and sulphur and carbolic acid, and coal oil and Paris green and blue vitrol just as much as you and I do to wash our hands when they are soiled. I wish to quote to you the prayer which the poet has put into the branches of the trees.

THE FRUIT TREES' PRAYER.

"O Master, we appeal to you;
For many years we thrived and grew
Upon the food dame Nature gave,
But, this exhausted, now we crave
The aid that you alone can give—
The food, without which, none can live.
Too long you've starved us in your greed,
You've cropped our ground, nor given heed
To Nature's fixed eternal laws;
That ends result from equal cause,
That constant cropping must exhaust
The food stored up at endless cost;
The grass, with myriad mouths, devours
The food which justly should be ours.
Root out, destroy this thieving foe!

In these terse, emphatic words:
Plant evergreens to shield your herds,
Your orchards and your homes from cold,
These beauteous trees outweigh your gold;
Enhance your pleasures every year,
And when the close of life draws near,
Your children's gratitude will fill
Your hearts with the prophetic 'Peace, good will.' "

A. M. N.—*From Western Rural.*

Missouri and other state interests are in many ways the same; what I know I will tell you, what you know you will tell me. Individually we are always and altogether reciprocating daily in what we do and what we say. The experience of our fruit men is made the common property of those interested on both sides of the line. Shall we cultivate? Shall we prune? Shall we use cow peas? Shall we sow to clover? Shall we spray? Shall we thin? These and many others have to be answered over and over again, and as one answers them by his own experience, another reciprocates by testifying to his own views whether they be the same or different. Community interests, how they dove tail into one another,

until it would seem next to impossible to do anything without influencing every one else by these same deeds and they are responded to by the actions of the community. In fact is not this reciprocity of ideas on the part of the fruit growers of Kansas and Missouri the powerful lever which moves this great cause forward?

I have outlined to you how closely all the affairs of the fruit grower are connected with the proper soil, subsoil, location, varieties care and cultivation of our fruit trees, and how truly they will reciprocate for all this, and now wish to call your attention to the other phase of this topic, of how easily and quickly all the insect life, the fungus disease, will reciprocate if you will but do them the favor of letting them alone." The insects will destroy, the fungi will blast, if we will but assist them by neglect. Their success, their development, their propagation, their power, depends upon reciprocity and that reciprocity is to be simply "hands off."

How quickly all the good things of earth respond to every favor shown, every work done, every assistance rendered, every improvement made while all the bad things of earth come if we only lie idle, only let them alone, only neglect to care for them.

Reciprocity comes more fully and more strongly and more truly when we go to the very foundation of things. Only one example. Suppose we take for the foundation of our apple orchard, the most perfect plumpest, soundest seed from the hardiest, best colored and best matured specimens of apples, taken from the healthiest, most vigorous, most productive trees. Suppose then that we take only the very best of these after letting them stand three winters and summers. Then let them be grafted and scions taken from the choicest trees producing the most fruit, highly colored and of best quality; what, think you would be the result after years of this continual selection both of seed and scion.

Tree planting of all kinds, how they return to us in a thousand ways, in shade, in beauty, in cool atmosphere, in homelike surroundings, in money value even, for all the care and attention and time and money spent on them. Plant them around the home, along the highways, in the fields and they will reciprocate for every attention and every care bestowed upon them.

"Canst thou prophesy, little tree,
What the glory of thy boughs shall be?"

SET OUT TREES.

Set out trees! adorn the homestead.
Make it pleasant all around,
Let the elms, and oaks and maples,
With the evergreens abound;
Let the home be so attractive
That the boy that is to-day,
When he shall arrive at manhood
And in foreign lands will stray,
May turn with longing heart and loving
To his home these hills among,
Thinking how the trees are thriving
Which he helped to plant when young.

Set out trees! yes, plant an orchard,
Dear, good farmer do you know
Of the wealth there is in fruit trees,
For the labor you bestow?

Set out trees! upon the common,
Ashes, linden, poplars, birch:
Set them out around the schoolhouse,
Plant them thick about the church,
Have the children's play-ground shaded,
And the public walks as well,
And the joys from these arising
Coming ages glad will tell.
These shall live, and grow, and gladden,
While we moulder 'neath their leaves,—
Let us then improve the present,
Leave behind us priceless trees.

—Mrs. Annie G. Marshall.

I call your attention to one more topic which shows how many friends we have who gladly reciprocate for the protection given them.

Our Birds. If there is any topic which the horticulturist should discuss at every meeting, on hill top or in valley, from every nook and corner of our land, from our school houses, our homes, yea, even our churches, it is the one great call, protect our birds. The almost universal destruction of bird life about our towns, the continual shooting of our feathered friends, the robbing of the nests, the collection of eggs, have so lessened them in number that we are being over-run with insect life. I only wish to read to you what our greatest American poet says to us all.

OUR BIRDS—LET US PROTECT THEM, THEY ARE OUR BEST FRIENDS.

Think of your woods and orchards without birds!
 Of empty nests that cling to boughs and beams,
 As in an idiot's brain remembered words
 Hang empty 'mid the cobwebs of his dreams!
 Will bleat of flocks or bellowing of herds
 Make up for the lost music, when your teams
 Drag home the stingy harvest, and no more
 The feathered gleaners follow to your door?
 What! would you rather see the incessant stir
 Of insects in the windrows of the hay,
 And hear the locust and the grasshopper
 Their melancholy hurdy-gurdies play?
 Is this more pleasant to you than the whirl
 Of meadow-lark, and her sweet roundelay,
 Or twitter of little field-fares, as you take
 Your nooning in the shade of bush and brake?

—*Longfellow.*

I can not omit the bees from those who reciprocate with us. They take the honey from our flowers, but the return a thousand-fold for the honey taken, by fertilizing our fruits and giving us good fruits, sound fruits, perfect fruits, and fruits in greater abundance.

Listen then to the conclusion of the whole matter. If any people in all the world should believe in reciprocity, preach it, practice it, teach it, sing it, demand it, vote for it, pray for it, they are the fruit growers of Kansas and Missouri.

APPLE ORCHARDS.

BREVITIES.

"COLORADO BEN."

Ben Davis was a handsome youth, but dry as any chip,
 For Nature gave him gaudy clothes, but let the flavor slip;
 And underneath his brilliant coat, he wore a pumpkin heart,
 A painted turnip, dry as bran, he went into the mart—
 A hypocrite—a Pharisee—a fraud in royal guise.
 Without a single drop of juice—a liar of great size.
 And those who bit his bloodless flesh were prompt with gibe and curse.
 They came with solid chunks of prose—the poets threw their verse.
 Ben Davis heard their stinging words, they rankled in his mind,

They cut him to his mealy heart; they forced him on to find
Some place where better quality might grow beneath his vest;
He followed Greeley's old advice, and took himself "out West."
On Colorado's sunny plains, where clouds are seldom seen,
Beside an irrigating ditch, he donned his coat of green.
The blood grew redder in his cheek, and, in the warm sunshine
Of mountain air, his flesh absorbed the flavor of the vine.
Ben Davis! Colorado Ben—apologies are due
From one who has, in former days, hurled ragged verse at you!
Wise hogs would hardly eat you for the second time back East,
But westward ho! With Baldwin you are reckoned at the least,
You "grew up with the country" where are mellow fruits—and men.
Now go up head! Good luck, old boy. Oh, Colorado Ben!

—R. N. Yorker.

I am glad that "Ben" is making a good reputation "out west." We, in Missouri have long since found that "Ben" is a good apple when grown on our hills, and it has long been known that "Missouri Ben Davis" are good to grow, good to keep, good to sell, are good to eat, good to cook, good to evaporate.

L. A. GOODMAN, Sec.

THE NEW APPLE BASIS.

The National Shippers' Association has adopted as a standard barrel the standard flour barrel, which is 17 1-8 inches diameter of head, 28 1-2 inches length of stave, and bulge not less than 65 inches outside measurement. Also a weight basis of 150 pounds.

The grade No. 1 has been divided into two classes, A and B. Class A apples must be not less than 2 1-2 inches in diameter and shall include Ben Davis, Willow Twig, Baldwin, Greening and kindred varieties in size. Class B must be not less than 2 1-4 inches in diameter, and shall include Romanite, Russett, Winesap, Jonathan, Missouri Pippin and kindred varieties. All No. 1 grade shall at time of packing be practically free from action of worms or defacement of surface or breaking of skin; shall be hand picked from the tree and of bright and normal color and shapely form.

NOTE.—This is the size of the apple barrel established by law for the state of Missouri.—[Sec.

APPLE EATERS' LEAGUE.

I find so many places where good apples are never served that it occurs to me that apple growers ought to organize an Apple Eaters'

League. Let's pledge ourselves to call for apples in some form whenever we eat a meal at a public table. Organize our friends, and see if we can't get millions of people to keep calling for apples! Demand them either raw, baked, or in sauce, pudding or pie. If the proprietor doesn't serve them, tell him he is a back number—"or words to that effect." **Make** the heaviest run on raw apples, for that will encourage the use of the best varieties. Just make yourself an agent for the advancement of American apples.—From Rural New Yorker.

SHAPING OF ORCHARD TREES.

1. There is considerable difference of opinion among good orchardists as to high or low heading of trees, says H. E. Van Deman, in "Rural New World." The most favor low heads, especially for the western states. While many good orchards are headed four and more feet high in Pennsylvania and farther east, there are many very good ones that are not so. The general tendency among the best fruit growers is towards lower heads in all sections. No rule can be laid down as to any specific height at which to head all varieties of any one species, much less a common rule for all species, because there are such different styles of growth. I like an apple tree to start its head from two to three feet from the ground, and to send out its branches one after another on all sides of a central stem as far up as they may be induced to do so. This divides the strain caused by future crops. A Northern Spy tree, which is of upright habit, should not be allowed to begin to branch as high as a Winesap or a Rhode Island Greening, which are of spreading habit. It may be necessary, in many cases, to head in some of the lowest branches, as their tips are bent to or nearly to the ground in future years. But this is much better than to have the tree too high.

The main reason given by most of those who contend for high heads is that they may plough right up to the trunks. This I do not wish to do after the first few years, for there is no benefit in doing it. The feeding roots are not there, and the brace roots should not be disturbed. No weeds of consequence can grow under the shade of a well-branched tree. A wide cultivator will reach well under the limbs any-

way. The advantages are greater difficulty in gathering the fruit from high trees than from low ones; greater distance of shade cast by them, and more purchase by the wind. One must use good judgment in planting the different classes and varieties of fruit trees. He must know his tree, what is its habit, therefore, its possible future. Pear trees should be headed lower than apple trees, because they generally have a more upright habit. Two feet is not far from right to begin their branching. Peach trees should be still lower—about twenty inches is an approved height. Plums vary greatly in style of tree. The Abundance and nearly all of the Japan class are very upright, while the Burbank is very drooping. The other classes of plums vary somewhat, too, but the native kinds are usually spreading and the European upright. From twenty inches to three feet is about the range for length of trunks, to be judged according to the necessities. Cherries are very much the same as plums, the sour kinds being of a spreading habit. Quince trees of all varieties that I know are prone to bend towards the ground, and need to be headed about two feet high, and then frequently pruned from below to keep the lower branches off the ground.—Colman's Rural World.

THE APPLE ORCHARD.

“If we leave nature alone she will plant weeds and grass to pump the soil. A timothy sod that will give two tons of hay per acre will pump out of the soil during the season five inches of water—equal to more than 4,000 barrels of water per acre. This may be more water than falls during August and September when the apple crop is most in need of moisture. To replace this amount of water would require the time of a man and a team a full month, even though the haul was only one-fourth mile. To save moisture is one of the most important problems of orcharding at present. We can not afford to divide the supply of food and moisture with either weeds or grass. The trees need it all, and must have it for the best results. We know that cultivation saves moisture. A mulch on the surface of the soil prevents the wind and sun

drying the soil. It has been shown by experiment that soil left undisturbed in the spring lost in a single week the equivalent of a good soaking rain more than cultivated soil alongside. The loss of 1,500 barrels of water per acre in a single week is an incident not to be counted upon in successful orchard culture, when so simple a remedy as harrowing is at hand. Less than a half a day's work of man and team will prevent much of the loss, but if the same man were set to work hauling water he could not put it on, in a drying time, as fast as the sun and wind would take it off. For practical irrigation a harrow beats a sprinkling cart ten to one. One other lesson the orchardist, as well as the gardener and farmer, needs to learn, and that is that a mere sprinkle of rain, and even a heavy dew, may dry the soil."—From National Stockman and Farmer.

WILL AN APPLE ORCHARD PAY?

Editor "Rural world:" We find this question asked by Mr. A. J. Kinnard, of Carroll Co., Mo., in the "Rural World" of March 9. I wish to say that the question may be fairly answered both in the affirmative and in the negative. My observation has proven to me that some orchards pay well, extra well, better than anything else on the farm, while others do not pay, and the money spent for the trees and time spent on them is just so much money and labor thrown away.

Whether an orchard will pay or not depends upon the intelligence of the planter. In order to make certain that it will pay, one must be intelligent enough to select a suitable location, as to soil and distance from railroad; to prepare the land before planting, to plant varieties that can be depended on for a commercial orchard, to know where to buy from a reliable firm at a fair price, to plant properly, and to cultivate and care for the trees in a careful business like manner. If one who contemplates planting an orchard wants to make sure that it will pay well, and does not possess this information, he had better make the getting of it his first move. He may do so in part by carefully reading such papers as the "Rural World" and others devoted to this interest, joining our Horticultural Society and attending its meetings. Or, still better, if he can do it, take the short course in horticulture at Columbia, which is offered to all

freely without money and without price. Not one single student who has attended and taken this course can be found who will not testify that what he learned is worth from five to ten times what it cost him.

I know of a few men in Missouri who are called upon through the mail for such an amount of information on horticulture that if they would charge for their work as do lawyers, they would soon grow rich. Why should the successful fruit grower who knows how to make an orchard pay, one who has given forty years of his life to the study of horticulture, be expected crowd the very cream of all he has learned into a letter to some stranger for the mere asking, and that often without a stamp to pay postage?

We horticulturists, the writer among the rest, are often blamed for giving the rosy side of horticulture and always telling of the orchards that pay and saying nothing of the many that do not pay. Now, in this I propose to speak of some orchards that do not pay and of some kinds that never can be made to pay.

One man that we are acquainted with bought 1,000 apple trees in 1890 for Ben Davis, planted and cultivated for four years, when they bore a little fruit, and to his surprise and mortification he found that he had 500 Whitney crab and 500 of a mixture of sweet and worthless varieties, but not one Ben Davis in the lot. This was the one fatal mistake. The location, land, planting, cultivation and all else were all that were needed to insure success. It was impossible to make this orchard pay. It was grubbed out and replanted with Ben Davis from a home nursery and responsible parties. It was a mistake that he did not do this in the first place. Then, again, all men before they plant 1,000 apple trees should be able to tell a Ben Davis from a crab apple tree by its appearance.

Another orchard of sixty acres in Holt Co., Mo., planted about thirty years ago, on fine land, and reasonably well cared for, never paid as well as corn would have done. Why? The trees came from the east. The varieties were the Domine, Northern Spy, Baldwin and many others all unsuited to the west for a commercial orchard. In fact, there are many similar orchards, but fortunately they are smaller.

I have noticed a number of orchards in south Missouri where the oak grubs are growing up thick all over them. These will never pay.

I was called upon to visit an orchard of 1,000 trees planted a few years ago in Holt county. The trees were bought from a traveling man who sold them for hardy, budded, ironclad, Simon pure stock at the low price of \$240 for the 1,000 trees. The buyer, poor fellow, never knew whether he was cheated in the varieties, for they all died before fruiting, in spite of their ironclad proclivities. This orchard never paid!

I know of many other orchards that have been planted with good trees and good varieties that were left to make their way among rabbits, borers, mules, calves and other stock, also weeds and grass that have never paid and never will.

N. F. MURRAY.
Oregon, Mo.

MY GRANDFATHER'S ORCHARD.

My grandfather's orchard! Ah, would I could see it
As when in my childhood I climbed its dear trees,
And tasted its treasures so fragrant and luscious,
And fitted each fancy to certainly please.
In springtime its branches with flowers were laden,
And promised each palate exactly to suit,
When old Time had wrought, with his wonderful magic,
The strange transformation from flower to fruit.

The yellow June Eatings, so mellow and juicy,
The Redstreaks, so pungently acid, for pies,
Seek-No-Further, and Russets, and Pearmain, and Greenings,
Spice Sweetings and Spies, I in memory prize,
Each name calls up visions, both pleasant and tender,
Of scenes that have forever passed from my sight,
Of fair summer days and long evenings of winter,
Of tasks done by day, and of frolics by night.

In autumn we gathered the apples with gladness,
And stored them in boxes and barrels away.
We buried our teeth in their fresh juicy crispness;
And thought the fruit harvest was nothing but play.
Dear trees! That they loved us we never could doubt it:
They ministered both to our fancies and needs.
Their beauty rejoiced us; we ate of their apples,
Our fortunes we told with the parings and seeds.

Hesperide's gardens could not have been fairer,
Nor sweeter to taste their famed apples of gold;
Fond love grants a charm to whatever it touches,
That safe from Time's withering touch doth unfold.
So grows in my heart my loved grandfather's orchard,
With blossoms and fruits ever fragrant and gay,
While birds in the branches are caroling sweetly,
And beneath them are children forever at play.

—*Ladies' Home Journal.*

ALL ABOUT APPLES.

The oldest, the largest, the richest, the best,
Whether grown in the East, or grown in the West,
For cider or jelly, sauce, puddings or pies,
The big red apples, the yellow cheeked apples,
Are the King of all fruits which the market supplies.

ORCHARDING AS A BUSINESS.

Written for Poultry, Fruit and Garden.

Orcharding is a word that has not been known in its full meaning until of late years, and especially so in the west. Not many years since if you had told a person that you were going into the work of "orcharding" he would hardly have known what you meant. To-day we have hundreds of men who are "orcharding" in the truest and fullest sense of the word. Years ago a person would have been thought wild who would plant an orchard of 100 acres. To-day we find them by the hundreds over our western country and many another who is planting 300 acres, 400 acres, or perhaps even 1,000 acres. Now we are no more astonished when we hear of some one planting two or three or more hundred acres of apple or peach orchards. The man now seems to go into it as a sort of business just as any other business man goes into his business.

This matter of "orcharding" has also become a favorite and sure plan for the investment of a few hundred or thousand dollars for safe keeping and sure returns.

No person can make a mistake in purchasing the cheap lands in Missouri all along our creeks, streams or rivers, where they are now mostly covered with a forest growth. Take these lands and chop, clear, burn off the brush or timber and plant to orchard trees. No person need fear that the cheap lands of Missouri will ever be any less in price than at this very time. Careful selection of some of these lands for future orchards and prepared in the proper manner for orchard growing will bring their owners two, three, five times the money spent on them if it be done in a legitimate manner and planted with the proper varieties. These cheap lands will be worth in a few years threefold the purchase price, and if planted in orchards will pay a wonderfully big per cent on the investment.

“Orcharding” means in its broadest sense the growing of apple orchards, pear orchards, peach, plum or cherry orchards in such quantities as to make it a business for the person who undertakes it. The orchardist should be a grower of all these fruits, so that he can supply his customers with what they want and when they want it. He will have a sufficient quantity of apples so that he can supply a firm with a lot of apples every week during the winter, and, if possible, far into spring.

Apple orcharding means then the growing of large quantities of apples for the wholesale buyer, or the dealer, or the grocer, or the family, or all combined. He wants then, first, a proper location, suitable soil, the right climate in order to attempt the growing of apples in a commercial way. In some vicinities you find the elevation above the sea 1,000 to 1,500 feet, and the correct location, where there are plenty of valleys to draw off the cold air and protect the fruit from destruction by late frost in spring or severe cold winter.

Here you will find the suitable soil that gives the best of color, the choicest in quality, the finest of texture and the greatest in quality of any of our apples, of any place in all this broad land of ours. Missouri offers untold advantages to the one who will go up and possess them. Here you will find the most desirable climate for the production of these fruits in abundance, perfection and beauty.

The elevation, the location, the soil, the climate, then, are what we want, and if this soil of Missouri, that is so rich in all tree growth material, in the iron that colors the fruit, in the potash that makes the wood, then we need not fear to so locate, so plant, so cultivate and so gather of these beautiful and pure and good fruits, that it will gladden the heart and give health, and dollars will line the pockets of the apple grower.

What we will do individually may be to follow somewhat the plan that we have always followed in all our business, a steady, earnest, continual at it. To-day we find one thing succeeds best, to-morrow another; this year one variety or one class of fruits may be our success, another year we may find that the same fruit or vegetable would prove a failure; to-day proves one fact, to-morrow disproves it. Seven years ago I advised a friend to plant out forty acres of apples and ten acres of peaches; last year if his trees had all been peach, he said he should have made enough to pay for the entire place. One year I had such a bountiful crop of

pears and secured such good prices that I wished all my trees were pear trees. But a few years later the pear trees all blighted, and perhaps next year my friend may have no peaches.

What we must do is to plod along with the best knowledge we can obtain each year, and profit by it, do the best we can, every duty and every work thoroughly and the will to do will make the success a sure one.

In spite of the wonderful success of special crops at certain times it is not wise to go too largely into any one thing exclusively, because if a failure comes it will be our all that fails. Better have the will to do a little of all things that can be done well and without conflict. All kinds of small fruits that succeed well and will give employment the whole year round seems to be the safest and sure one to success. If you have the will to do you need not fail.

I wonder when this subject comes to me, what we will do, if we are as slow to learn of this change of times, and seasons, and customs, and business, as were the people here at the close of the war. I wonder if we begin to understand that we must adapt ourselves to this new order of things, and do twice the amount of work for one-half the pay. If not, then we fail to realize the questions, and times, and demands that are staring us in the face.

When I located at Westport, over twenty-five years ago, there came to my grounds every day an old gentleman (riding upon his little pony), of the times, and customs, and manners, and business of before the war. He looked on in disgust at my planting berries, and vines, and trees, and evergreens, and his continual advice to me was that "you will never make a cent out of all this work and nonsense. I have been here forty years cutting down just such things as you are planting. Go and raise hogs and mules, and cattle and corn." He never came to realize, to the day of his death, that it was a new era of things, that the old times had passed away, never more to return. He died mourning the good old times, and was continually repeating that town, and country, and people were going to destruction as fast as possible..

So, I think, when we hear the complaints and fault-finding, and recurrence to old times, and old prices, and old profits, and old successes, if we are not as blind to the changes of our times at the close of the war in many parts of our state.

What we will do is to take these questions, and times, and seasons, and changes, and go at them with the same vim that we did ten, fifteen, twenty or thirty-five years ago. What will we do? Ask the young man of twenty or twenty-five years. He never grieves over old times, but with all his energy, and earnestness, and enthusiasm, he works with consciousness of nothing but success.

L. A. GOODMAN.

Westport, Mo.

A STREAM IN AN APPLE ORCHARD.—IS IT A BENEFIT?

Editors Country Gentleman:

I am going to present what may be called a study in fruit raising that ought to draw out other notes on the subject, from which it is quite possible a great amount of information on this peculiar condition of things will be derived. My old home in Otsego county is not the fruit growing district that western New York is. The winters are too cold, and the season is not so long. I think the soil is well enough adapted to the growth of fruit trees, but the cold winter and slow summer prevent the proper ripening of the wood, and so the stand of the most hardy and vigorous sorts is not always what it should be. I recall an attempt to raise peach trees, which succeeded well as far as growth was concerned, but cold weather found the leaves on the trees just as green and vigorous as they had been in midsummer. Of course the winter froze the trees to death.

About forty years ago, a neighbor planted a row of apple trees in a very peculiar position. A small stream ran through a field a few feet from the road fence, which was a stone wall. The strip of land between the water and the fence was not worth plowing, and so apple trees were set on it. To keep the small boy and the traveling public from temptation, the Northern Spy was selected. This variety is a very shy bearer in that district, and the success of the venture is all the more apparent on that account.

A late visit to the old home finds this same row of apple trees the wonder, fairly, of the neighborhood. On the same farm is what was at one time a very productive orchard, but I am told that it does not now

begin to bear with the one row of trees, protected on the north by the wall and fed from the south by the stream. These trees bear a crop practically every year and of the finest fruit. They are never cultivated and never fertilized. So far as appears they enjoy no special advantage except such as is derived from the running water into which some of the roots of each tree must grow. It is true that the stream runs close to the farm barn, and may obtain some of the juices of the yard, but it certainly does not get enough to color the water. From what appears, there seems to be an almost complete change of climate produced on that narrow strip of land by the fence and the stream, or more likely, the stream almost alone.

I have not read any expert advocacy of this sort of culture of apple trees. We have been given to suppose that rich, deep, but comparatively dry soil was the best for fruit trees of all sorts. In the case before us I am convinced that the presence of the stream, being, as it is, slightly below the level of the little ridge on which the trees stand, insures good drainage as well as constant irrigation, and that the roots of the trees are some how trained to act in a double capacity, some of them reaching out for the water and others for what must be had from the dry soil.

If this supposition is correct, and the chance success can be repeated, we ought to see in all parts of the country our small streams lined with double rows of fruit trees. I am not at all sure that, in level districts, especially with clay soil to hold the water, the experiment could be expected to succeed, for the conditions noted are very different from anything of that sort. The soil is essentially gravelly, with no clay, and the descent is sufficient to produce a swift current. It is also quite likely that the water runs fast enough to insure a bed containing more or less stone, as such is the rule in that section. This stone is to the south of the row of trees, and ought to warm and quicken the soil considerably.

JOHN CHAMBERLAIN.

Erie county, N. Y.

NATIONAL APPLE GROWERS' MEETING.

"Methods of Field Work" was introduced by L. K. Sutton. Under this head a variety of subjects were discussed, special attention being given to proper lines to pick and pack. Mr. Beckwith thought that most

people made the mistake of picking too soon. He also said that two pickings of a tree is preferable, the outside of a tree being first picked and leaving time for the inside fruit to color, this being particularly true of the Ben Davis. Mr. Hendrickson agreed with this opinion and added that apples should not be left to sweat under the trees but should be barreled and put into cold storage as soon as possible. The subject of too early picking had not been considered by many of the members and nearly every member had some question to ask or some valuable experience to give. Mr. Cummings, of Portland, Me., introduced the following resolution:

“Resolved:—That the National Apple Shippers’ Association, in convention assembled, hereby respectfully request the receivers of American and Canadian apples in the city of Liverpool, Eng., to adopt an invariable rule of allowing no rejections from apples once catalogued and sold in the auction room, and the secretary of this association is hereby directed to mail a copy of this resolution to each receiver of sail goods in said city at an early date.”

In support of this resolution Mr. Cummings related his experience in witnessing auction sales in Liverpool. Mr. Forster, of New York, and Mr. Peterson and Mr. Shuttleworth also discussed the resolution, the last named being of the opinion that rejections are few. Mr. Fred Pritchard, of Liverpool, was called upon and thanked Mr. Cummings for the tribute he paid to the integrity of the Liverpool brokers. He stated the difficulties in the way of correcting the abuses complained of. He drew a comparison between the broker of to-day and the time when he first entered the business. He said that the buyers in England now dictate terms to receivers and brokers somewhat as the members of this association dictate terms to farmers. He did not see how the passage of the resolution could help matters. He thought no apple shipper’s education was complete without a visit to England.

Mr. Pritchard moved as a matter of courtesy that a copy of the resolution be sent to the secretary of the Fruit Buyers’ Association of Liverpool, and stated that its object was to drive the disreputable houses out of business and had the support of a large part of the trade of Chicago.—Report from Fruit Trade Journal.

PLANTING BETWEEN TREES.

When one is planting a new apple orchard, we think he can scarcely do better than to plant the spaces between the trees with the bush fruits, raspberries, blackberries and currents, as the cultivation given these fruits will also be such as is best adapted to apple trees, and we would say to pear trees also.

The manuring given the small fruits to keep them thrifty and productive will not be too much for the best growth of the trees, and will not make too rank a growth of wood, as might be the case if root crops were put in and heavily manured, while the plants will not rob the tree roots of moisture or keep the ground between the rows too much shaded and too cool, as would a grain crop.

A number of good crops of these berries could be taken before it would be necessary to remove them, or before the trees would get in bearing and occupy the whole land. In fact, we have seen them after the trees were quite large, and when a part of them were much shaded by the trees, and the owner liked it because, as he said, it prolonged the season of bearing for the small fruits, those in the shade being made nearly two weeks later by their position. They were kept well manured, enough being put on for them and for the trees, and the grass and weeds were kept down.—*Am. Cultivator.*

HISTORY OF THE YORK IMPERIAL.

During forty years of fruit culture I have become familiar with the characteristics of many varieties of fruits, and of no one has there been a greater diversity of opinion than the apple generally known as the York Imperial. This variety originated in the neighborhood of York, Pa., and was introduced by Jonathan Jessop early in the nineteenth century.

Mr. Jessop was born in North Carolina in 1711, being the son of Thomas Jessop and Ann Matthews, Quakers.

He established the first nursery in York county and was the first fruit grower to recognize the value of the York Imperial. This was a chance seedling on the farm of a Mr. Johnson, and for several years after

the tree came into bearing the fruit, from its unattractive appearance in the fall, was not gathered. Mr. Johnson was an invalid and spent most of his time during the day sitting at a window watching the country people as they passed to and fro on their trips to York.

He had noticed the school boys of York visit this particular apple tree in the spring for several years, kick away the leaves, fill their pockets with apples, returning weekly until late in the spring. On one occasion he sent a farm hand to secure some of the apples and to his surprise Mr. Johnson found them to be of a bright red color and of good quality—when other late-keeping varieties of his orchard had been wilted and insipid.

Calling Mr. Jessop in as he passed on his way to his nursery, Mr. Johnson presented him with some of the specimens that had lain on the ground all winter. Mr. Jessop, impressed with the good keeping qualities of this variety, propagated it under the name of Johnson's Fine Winter. The merits of this variety not being generally known, Mr. Jessop propagated many trees for which he had no sale and when they became too large for nursery stock he pulled them up and threw them in a ravine near the Baltimore and York turnpike. The farmers who attended the York market, on returning home filled their wagons with these trees and planted them on their lands. Mr. Jessop being informed of this fact by a farmer whose lands adjoined the nursery, replied: "Well, if they will not buy trees to plant I am glad that they will take those for nothing." By this means York county led the way in propagating this variety, which has been worth thousands and thousands of dollars annually.

A basket of this variety of apples having been sent to A. J. Downing, America's most noted pomologist, by Mr. Jessop, their receipt was acknowledged by a letter from Mr. Downing in which he said: "It is the Imperial of late keepers, and as it originated near York, I would suggest York Imperial as an appropriate name." Johnson's Fine Winter and York Imperial are one and the same variety. After Mr. Jessop's death the nursery was taken charge of by his son, Edward. Mr. Edward Jessop had in his possession the letter from A. J. Downing from which the above extract was obtained by the writer of this article. In 1863 after a lengthy search I located the stump of the original tree in a corner

of a worm fence, all the trees of the adjacent orchard having been cut down and the stumps removed.

In the next article I shall fairly discuss the merits and weak points of this variety, and I hope to be able to reconcile the different opinions that have appeared in your valuable paper from time to time concerning the value of this variety.

S. B. HEIGES.

York county, Pa.

PEARS.

ORCHARD LANDS OF LONG AGO.

The orchard land of long ago!
O, drowsy winds, awake and blow
The snowy blossoms back to me
And all the buds that used to be!
Blow back again the grassy ways,
Of truant feet, and lift the haze
That trail their tresses in the seas
Of grain that float and overflow
The orchard lands of long ago.

Blow back the melody that slips
In lazy laughter from the lips
That marvel much that any kiss
Is sweeter than the apple is.
Blow back the twitter of the birds;
The lisp, the thrills and the words
Of merriment that found the shine
Of summer time a glorious wine
That drenched the leaves that loved it so,
In orchard lands of long ago.

O, memory, alight and sing
Where rosy-bellied pippins cling
And golden russets glint and gleam
As in the old Arabian dream—
The fruits of that enchanted tree
The glad Aladdin robbed for me!
And drowsy winds, awake and fan
My blood as when it overran
A heart ripe as the apples grow,
In orchard lands of long ago!

—James Whitcomb Riley.

SOMETHING ABOUT THE PEAR BLIGHT.

Pear blight microbes are found in abundance in diseased tissue, can be cultivated, and the disease reproduced in healthy trees. They can not be killed by cold, but die at a temperature of very hot water. The host plants are the pear, apple, crab, quince, sarvis berry, etc. The microbes move en masse from one cell to another, breaking down the cellular walls, passing in millions through and between. In blossom blight the microbes appear in the nectar and penetrate the nectaries, multiply and go down the stem. Bees visit the blossoms and carry the microbes from flower to flower. The disease spreads with great rapidity; only the brief time of blooming cuts this short.

Spreading through the fruit spurs, these are killed to the bough. The virus when it appears outside can be carried only by special means—birds and man. Even after blossoming, there is possibility of infection of the green tips. The disease may also start in tender growing bark. In artificial infection in the field it was never spread except where punctures existed. When started in tender twigs, it spreads downward till it meets cells too firm to be affected. From the fruit spurs it will spread up and down, girdling the branch. If the woody cylinder is uninjured, the branch may live a year or more; but hot, thunderous weather causes the microbes to overflow into the cylinder and the branch collapses suddenly. The microbes die if they can not spread.

If any of them live till fall, they may live over till sap runs in spring and spread rampantly. The hold-over blight will spread upward and the mummy virus run down, ready to spread the infection. The blight varies according to the tree. Some varieties are easily attacked while others are more or less immune.

Treat the disease always as infectious. Watch every evidence and destroy at once. With fruit spurs low down and sprouts on the trunk, the blight gets quickly into the center of the tree. We must train and prune our trees differently. To fight the disease, the vase form of top is better than the pyramidal. To produce the former, grow three shoots on the stem, cut back and grow two on each of these, cut back and grow two more and so on. This produces a low head broad at the top, with fruit spurs above and smooth limbs below.

This prevents the rapid spread of the disease and aids in cutting it out when it gets a foothold. The pyramidal form may also be modified to carry out this plan. Prevention is better than fighting.—W. B. Wait, in *Denver Field and Farm Fruit Growers' Journal*.

GROWING QUINCES.

Quinces do not, as a rule, do well everywhere; but there are very few places where they will not fruit. They occupy but little room and their fruit is always in demand. It is especially fine when canned.

The peculiar flavor of the fruit is strong enough to flavor many times its own weight of other fruit preserves when used for that purpose.

The quince and the asparagus plant enjoy the peculiarity of being able to assimilate more salt than any other two members of the vegetable family thus far brought under cultivation. If manure from the pig sty is used about quince trees they seem to do very well, but one of the best fertilizers that I have seen is common salt, about one quart for each tree, worked well into the soil. They need fertilizing every year. They should also be pruned.—Ira Graber, in *Farm, Field and Fireside*.

PRUNING QUINCE TREES.

I have a one-year-old Meech quince orchard. I did not trim it when I set it out last spring. The trees have sent out long, spindling branches. How shall I trim it and when? Shall I cut it back pretty well so as to insure shapely trees, or must I only thin out and remove dead branches? I want to do the best thing for the future welfare of my orchard.—A. A. T., Glendola, N. J.

The long straggling branches of the quince trees should be headed back to such distance as will insure moderately compact heads to the trees. About March or April will be a suitable time to do the work. The quince does not make a tall, stately tree, but is more bush-like than most fruit trees, and is, in many cases, difficult to train into satisfactory form. Quince curculios are so abundant in many sections, that it is necessary to jar the trees as plum trees are jarred, in order to catch them,

and it is usually very profitable treatment. The little knotty depressions on the fruit are largely the work of these insects. In case jarring is done, the trees must be trained with bodies tall enough, and with sufficient room under the branches to spread the catcher.—H. E. Van Deman, in R. N. Yorker.

STONE FRUITS.

PEACH CROP GLEANINGS FROM U. S. DEPARTMENT OF AGRICULTURE.

The blizzard of February, 1899, and the intense cold weather accompanying it have played havoc with the peach industry throughout the country. The U. S. Department of Agriculture is receiving reports from all sections, and the consensus of opinion is that there will be no luscious peaches next summer. Where growers get off with only the loss of their crop they consider themselves lucky. Mr. Hale says that practically every peach tree in Connecticut is killed, with the exception of one variety, Hill's Chili, which has suffered little injury, even to the fruit buds. It, however, is a poor peach, being rather dry, and is not used for eating purposes when other varieties are to be had.

It is not the impression, however, of the pomologists of the Department of Agriculture that the Georgia peach trees are dead, as reports from Missouri, Tennessee and Kentucky indicate that while every peach bud has been killed, the trees are not generally fatally injured.

The fruit industry of northern Michigan received a terrible blow. Not only the peach trees, but in many cases the hardier apple trees, succumbed. The mercury stood below zero for two weeks, and the ground was frozen four feet deep. Never has such destruction swept the lake region since the great freeze of 1874-'75, when every peach tree was killed. A trustworthy grower near Ludington, Mich., reports to the

Department that all his Ben Davis, Baldwin, Early Harvest and Sweet Apples, some of them trees twenty years of age, have been killed. Northern Spies proved more hardy and are alive, though their fruit is killed.

Apparent relief in a small way comes to lovers of peaches from a few sections, one in northern Pennsylvania and in the Niagara region of New York, where the thermometer registered only about ten degrees below zero, and where it is believed that peach buds have not been greatly injured, but unfortunately these sections do not contain any great number of peach trees, though around Niagara there are a good many plums, cherries and pears.—From Fruit Trade Journal.

PEACH TREES.

Regarding the best treatment of autumn budded peach trees that have had their wood frozen half way to the ground by the severe winter, I would follow the plan last suggested of cutting away the injured wood now, and then treating the trees in the ordinary manner, by cutting back to within one or two inches of the bud as soon as growth begins. I would, however, prefer not to transplant the trees until they shall have made one season's growth where they now stand. It is a fact amply demonstrated that to leave injured wood on a tree will weaken the growth of the uninjured parts. If the injured wood is cut away before growth begins, however, the remaining parts will make vigorous growth, since the root system retains its normal vigor and has a reduced top to supply with sap. A vigorous root system will also stimulate growth in a part of the injured wood if it is not actually dead. If the injured wood is left on, the energy of the root system will be spread over too large an area, in attempting to revivify the whole weakened top and consequently all parts of the tree will suffer. I think a great many are exaggerating the injury done our peach trees during the past winter. Some are even grubbing out trees that might be saved. If properly cut back, most of the peach trees of the state may not only be saved, but will be all the better in two years for the renewal process that will result from the severe winter pruning. Peach trees that are injured and have not been pruned should

be cut back now. Injured nursery stock, properly cut back just after the freeze and planted in our forcing house for experiment, has already made six or eight inches of new growth to each branch.—J. C. Whitten, in *Rural World*; *Horticulturist*, Mo. Exp. Station.

SETTING OUT PEACH TREES.

After the ground is put in the proper shape to receive the trees I take a two-horse plow and set a stake at the opposite end, where the row is to be; next, measure from where I started in for the next row; have a good steady team and plow straight to the first stake; then measure off the next row to come back on and keep on so until you get each row marked with one furrow.

When this is done plow another furrow, throwing it the opposite from the first. This will make quite a ditch, or dead furrow, as we often call them. Then take what we call a winged shovel plow and a large steady horse and trace each furrow. This will make a place deep enough and wide enough for the trees. Next, mark it crosswise by drawing a chain across the furrows. This will make a mark sufficiently plain to designate where the tree is to be set.

The field being prepared, take a few trees in your arm at a time—not many, as the wind and sun will dry them out too much—and have a man to assist you. Step up to the cross in the furrow and let the assistant hoe enough dirt in the ditch at the cross to make it the right depth to set the tree, and while he is making this preparation you keep your shears in hand and prepare the tree, by cutting off all but a few limbs. Cut the limbs that remain from one-half to two-thirds off and cut the roots off quite short. Then set them in the prepared bed, and hoe enough dirt on them to cover the roots, shaking the tree up and down so as to sift dirt between the roots. Tramp the dirt as solid as you can and hoe a small hill of dirt on the solid dirt around the tree and leave that loose.

When all the trees are thus treated straddle each row with a double tender with large shovels on and throw the ditch full. The planting is then complete for small trees. If the trees are too large for double tender, take a shovel plow and one horse.

I wish to say in regard to peach trees, cut the roots very short and all the limbs or branches off close to the tree, and the top off so it will be only a stub from fourteen to twenty inches high.

By so doing you can make a nice low top, but when the shoots begin to start you must keep close watch of them and cut off all that starts, except where you want a branch, and take pains that you do not start two branches from the same height, or it will make a forked tree and be easily split.—A. Schultz, of Indiana, in *Farm, Field and Fireside*.

EXPERIENCE WITH FROZEN PEACH TREES.

After the hard freeze of last February we examined our trees carefully to ascertain the extent of damage and to make up our minds as to the proper treatment. After a thorough examination of the trunks and branches we concluded that there was enough life and vitality left for them to recuperate if properly headed in and thinned out. So we cut back and thinned out all such limbs as the trees could spare without destroying their form, thus reducing the evaporation that would occur later on.

The results are handsome tops with healthy, vigorous growth that has every prospect of setting a good supply of fruit buds for the next season's crop. This is as we expected, but there was a time during the efforts of the trees to survive that we were about ready to go back on our own judgment. This critical period was when the first foliage had exhausted the food stored the previous season, and owing to the enfeebled condition of the tree the root growth could not come to the support of the first leaves in time to save them. This was when they looked to be dying. The leaves turned yellow and came off in showers, and we almost lost confidence in our judgment as to frozen peach trees and how to treat them. It does not require much effort to make us see the mistakes of others, but to have to acknowledge the error of our own ideas is quite a different thing.

In conclusion will say that we are well pleased with our trees and hope there are many others who have orchards that are showing up as

well. The orchard referred to belongs to H. A. Aldrich, of Neoga, Ill.

Hoping the Ozark people and country are prospering, I will close.—
A. C. Skinner, of Neoga, Ill., in the Southwest.

THE PEACH ORCHARD.

The peach orchard, by J. M. Russell, developed the fact that in twelve years they had raised eight crops. In the last twelve years the crop has never been destroyed by weather subsequent to January 15. That is, if the fruit buds safely reached the middle of January, they had always raised a larger or smaller crop. For commercial orcharding Mr. Russell prefers high land, and if desirable to have windbreaks, advised to plant more rows of peach trees to act as such. Best varieties are: Alexander, Early Rivers, Hale's Early, Russell's No. 1, Coolridge Favorite, Champion, Crosby, Hill's Chili, Wager and Wright. He is experimenting with Triumph, and hopes it will do well. He has not yet tried Bokhara No. 3, but hears good reports of it. In discussing the reasons why forty acres of six-year-old peach orchard gave no fruit and an older orchard five miles south set a heavy crop, the thought was brought out that heavy October rain prevented the ripening of wood and fruit buds, rendering them susceptible to succeeding cold. Where October rainfall was light or absent peach trees ripened perfectly and set a full crop. Peach wood and fruit buds should be perfectly ripened in the fall of the year.—Orange Judd Farmer.

MORRILL ON PEACH CULTURE.

Roland Morrill describes his method of growing peaches in his successful orchards at Benton Harbor, Mich., as follows:

He cultivates the peach tree by pushing it ahead as rapidly as possible, fertilizing none until the bearing years have been reached. The ground beneath the trees is cultivated by plow, harrow or weeder, as often as from thirty-five to fifty times a season, the weeds are kept clear and there is abundant opportunity for moisture. The consequence is

that the tree matures within three years to be from ten to twelve feet high with a body five to six inches through and about twenty inches in height at the trunk. The peaches from these trees can be picked easily, most of them from the ground, and Mr. Morrill quoted one instance where a ten-acre section of trees eight years old, had netted him \$11,000. His illustrations showed the most vigorous pruning, and he said that after the first three years he cut and trimmed out nearly two-thirds of the growth of wood. Fertilization for the crop was of wood ashes and ground bone, with a good surplus of ashes.—Fruit Growers' Journal.

Ex-President J. H. Hale, South Glastonbury, Conn., is quoted as saying of peach trees: "Medium sized trees, three or four feet high, are best to plant, and they should be trees one year old. In fact, no nursery ever delivered a two-year-old tree, though it is claimed that they do."

CHERRIES.

Prof. F. A. Waugh gave some notes on cherries, gleaned from the work of the experiment station and from trees sent out by the station. He said that from the distribution of a miscellaneous lot of fruits, largely of Russian varieties, much the larger part of the favorable reports received were from the cherries. There were two reasons for this, both significant. First, the Russian cherries are generally the best of the Russian fruits; and second, cherries as a class are better able to stand the neglect of common farm-yard treatment than other fruits. Notes were given on a large number of varieties, among which the following were favorably mentioned: Morello, Montmorency, Brusseler, Braun, Bessarabian, Schatten Amarelle and Wragg, the latter being possibly a synonym of Morello. Others present had good success with Early Richmond, Dyehouse and Olivet.—Country Gentleman's report of Vermont Society.

SPROUTING CHERRY PITS.

Please let me know the best way to sprout plum, cherry and peach pits. I am in the nursery business on a small scale, and although I have always put my seeds in beds in fall, have had trouble to get them to burst in the spring.—H. M. K., Newville, Pa.

Our correspondent's trouble rises perhaps from not having the seeds moist enough in the seed-bed. If a seed-bed is too dry and not covered by snow, so that the seeds simply freeze dry, the results are not likely to be good. We advise stratifying the seeds in this case—that is, the pits may be mixed with soil and put into a convenient box wherein they are buried, box and all, in some situation where they will keep moist through the winter and where they will freeze well. In the spring they can be sifted out of the earth and planted, usually with success. The writer, who generally handles a few such seeds, prefers to go over them by hand in the spring and crack with a light hammer any pits which are not sufficiently opened. This always gives the desired result.—Country Gentleman.

SATSUMA PLUM.

Mr. Hale writes us interestingly as to the Satsuma plum. He says:

"The criticisms that have been made by many in relation to the Satsuma plum not fruiting freely, have seemed to apply to young trees, for we are all learning that, as the trees of this variety grow older, they are inclined to become very productive, in some cases so much so as to surpass nearly all others. It is a wonderful plum in its keeping and shipping qualities, and nothing can compare with it for canning purposes. I predict that, within a few years, Satsuma will take a much higher place in the opinion of orchardists than at the present time. Red Negate or Red June, as they are one and the same, is also beginning to be appreciated. It is almost as large and handsome as the Abundance, and so much earlier as to prove very profitable in market, although of only fair quality. The still newer Red May is fully as large and a week or ten days earlier; while I have not eaten the fruit of it as grown in the

north, it is of fairly good quality as produced in the south. It is said to be a seedling of the Abundance, which it somewhat resembles, although far earlier.—Rural New Yorker.

COMMERCIAL VALUE OF JAPAN PLUMS.—HARDINESS COMPARED WITH PEACHES.

They Stand the Cold.—I am growing these plums in orchards quite extensively in Connecticut and in Georgia, and am convinced that many of the varieties have points of merit that will make them permanently valuable orchard fruits in these two sections, but in the central Atlantic states, say from south Philadelphia to South Carolina, they bloom so early that they are often liable to be caught by spring frosts. At the north they will stand a great deal more freezing than peaches. I think it is safe to plant them anywhere where the mercury does not go much below twenty-five degrees below zero. In my orchards in Connecticut at this time, peach buds, even on the most hardy varieties, are all killed, and while the plum buds are hurt somewhat, there are more than enough left for abundant crops; probably very severe thinning will have to be resorted to to secure full size fruit.

In the South.—In Georgia, the middle of February, after weeks of warm weather, many of the plums coming out in bloom and peach trees just showing the pink, peach buds entirely killed and trees badly injured, yet enough buds were left alive on some of the varieties of Japan plums so that there will be quite a little crop of fruit. For two or three years, varieties like Red June, Abundance and Burbank have been shipped to the northern markets from Georgia, and sold on an average twenty-five per cent higher than peaches, with an increasing demand each year for the fruit. In New England, they have been marketed for the last three years to a considerable extent, have sold fifty per cent higher than peaches in the same markets, and the demand has always been ahead of the supply. They have thick, tough skins, and are not seriously injured by the curculio. Trees will thrive on very light, thin soil, or on that quite heavy and moist. The quality of the fruit is good, and they can be kept

in the market from one to two weeks after being picked from the tree, in fair eating condition.

The Best Sorts.—Red June, Abundance and Burbank are the most satisfactory of the well-tested varieties. Satsuma needs more maturity of tree before coming into full bearing, for while the first three named will fruit freely two or three years after planting, Satsuma requires about five. Of the newer sorts, Wickson is the largest and most attractive in appearance, while the Hale is best in quality of all the Japans; but these two varieties and the Satsuma are extra early bloomers, and on this account, more liable to be caught by late frosts in spring than some of the others. Of other well-tested sorts, Willard and Berckmans should be rejected as far too poor in quality to be worthy of propagation. Ogon and Normand, both yellow varieties, are vigorous and productive trees, but not very high in quality. Chabot, sometimes known as "Yellow Japan," "Chase," etc., is a late ripening plum of fine appearance and good quality. The Gold is a small, weak-growing tree, with fruit somewhat like the Ogon, only not so good in quality.

Many new varieties are being tested; probably some of them will prove of greater value than those we already have, and an orchardist will not go astray in planting the best ones here mentioned. Every one who owns a family fruit garden in the central northern states makes a big mistake if he does not have a good number of these trees on his grounds, for the best of the Japan plums can be grown almost as cheaply and abundantly as the most common apples.—From Rural New Yorker.

GRAPES.

GRAPE BULLETIN.

The following is a summary of the results of these studies:

1. The following varieties ripened in 1898, ahead of Moore's Early, Early Ohio, Champion, Green Mountain, Moyer, Hartford, Jewel, Ives, Janesville, New Haven, Aminia and Brighton.

2. Among the best very early varieties for commercial planting, judging from our own experience and the experience of practical growers, are: Green Mountain, Campbell's Early, Jewel, New Haven, Aminia, Brighton, Moore's Early and Norfolk.

3. The grapes having the largest berry are: Columbian Imperial, McPike, Eaton, Salem and Moore's Early.

4. The Ozark is the most vigorous and productive variety we have tested.

5. Among the most promising comparatively new, or little known varieties are: America, Aminia, Brilliant, Campbell's Early, Green Mountain, Hicks, McPike, New Haven, Norfolk, Ozark, Rochester and Rommel.

6. In our opinion more attention might profitably be given to the growing and working up a demand for fine table grapes, especially the earlier varieties. The demand for grapes of the best quality increases as the consumers become acquainted with their merits, and acquire a taste for them.

7. It pays to sack fine table grapes of most varieties, as it adds to their appearance, and keeping qualities, thus increasing their value and insuring ready sale at good prices. Those that are capable of self-fertilization should be sacked while in blossom or before; those incapable of self-fertilization should be sacked as soon as the fruit has set.

8. Those varieties which have descended from our native *Aestivalis* grape, or from the closely related Post Oak grape, are more healthy,

vigorous and drouth resisting and hold their fruit longer than other classes of grapes in this section. They are also more prolific if we count simply the number of berries set regardless of size. In some varieties of this class, the berries attain very large size without diminishing the number of berries in the cluster. Ozark is an example.

9. Varieties of the *Labrusca* class have the largest and handsomest fruit, and produce most in quality, though not in number of grapes. They sometimes suffer from the heat of summer.

10. The hybrid varieties between the American and European grapes average highest in quality, though they lack the vigor, health and drouth resisting capacity of our native grapes.

11. About sixty per cent of the varieties tested are capable of perfect self-fertilization, that is, they will set fruit without the aid of pollen from other varieties. The remaining forty per cent are not fruitful unless pollinized by other sorts, and should be planted adjacent to strong pollen-bearing sorts that flower at the same time.

The varieties most largely grown for profit in this state by those who depend upon shipping to supply the ordinary demand are: Moore's Early, Worden and Concord. These standard sorts have been found to succeed well on the station grounds.

The best table grapes combining fine quality with at least a fair vigor and productiveness are: Green Mountain, New Haven, Aminia, Brighton, Moore's Early, Norfolk, Massasoit, Ideal, Diamond, Barry, Rommel, Woodruff Red (finer in appearance than in quality), Lindley, Challenge, Norton, Rochester, Jefferson, Agawam, Poughkeepsie Red, Brilliant and Berckmans ripen in the order named.

Sacking grapes just after the fruit is fairly set, when grapes are about as large as pin heads, improves the quality of some varieties, protects the fruit from rot and insects and makes the skin of the berry more tender. Self-fertile varieties may be sacked before the bloom opens, and the Green Mountain improved wonderfully in quality when so treated. Although an early variety, where the Green Mountain was sacked before the bloom opened the fruit remained on clusters till late in September.

In Aminia, Brighton, Lindley, Brilliant, Goethe and many other sorts, we have varieties that are certainly as good as the California product, picked green and shipped half way across the continent.

The present rapid introduction of new varieties, adapted to special purposes, extends the grape season over a longer period, and adapts the grape to a greater number of special purposes. The improvement in the quality of certain kinds renders the grape a more desirable dessert fruit. These facts increase the possibilities of a much larger consumption of the grape than now exists.

Some men make money by growing superior varieties and labeling them "Concord." The name suits the people; the improvement in quality suits them better. Once they buy such grapes they become anxious to secure this brand of "Concords" even at an advanced price.

Why not grow more of the best grapes; label them true to name; educate the consumers to an honest appreciation of the merits of each variety, as well as to the special purpose for which it is adapted, and thus increase the demand for a larger grape product? There are people in any market who want to buy good grapes, once they become acquainted with them. Goethe has sold here for eight cents per pound, to the few people who know its quality, when ordinary grapes were a drug in the market at two cents a pound.

J. C. WHITTEN.

Horticulturist State Agricultural College.

THE VINEYARD.

From the Planting to the Trellis.

Editor "Rural World:" In planting the grape vine, the variety governs the distance apart for the vines. I will speak of the Worden and Concord, two of the best well-known black grapes I know of. I plant them in rows eight feet apart, and twelve feet apart in the rows.

The preparation of the soil should be deep, and thorough. Set the rooted vines down to the last bud. Prune them back to about four buds on the canes made while they were being rooted. If the soil is rich, and

a rank growth of vine is expected the first year, let only two canes grow; if soil is poor, and a feeble growth expected let only one cane grow. Supply each vine with a stake seven feet tall. As soon as the vine starts climbing tie it to the stake, rubbing off all side shoots or laterals, tie up and prune after. Keep the vine climbing straight up the pole and allow no growth wasted in surplus laterals. Cultivation should commence early and be thorough. A single section of a fifty-tooth steel frame harrow, using one horse, is a very convenient and suitable outfit with which to keep the surface in good condition and surplus vegetation in check. Some hoeing may have to be done to destroy such strong-rooted weeds that the harrow will not tear up. Some weeding in the hill will also be necessary.

About the middle of June, if you like, plant the ground to cow peas, the Whippoorwill being my favorite, on account of its bunchy habit of growth. Keep the harrow going just the same, at least once a week through the rows both ways. There is a short period of time, all pea-growers know, that will not do to harrow them, and this is from the time they first come up until the third leaf appears. When the vines get too rank for the harrow it is time to stop cultivation. When the peas ripen they can be hand picked and saved for seed. The vines can be left on the ground and serve a splendid purpose as mulch to prevent the winter rains from robbing the surface soil of the fertility brought there by the peas and the thorough cultivation.

The grape vines can go into winter just as they are. I had rather prune as soon in the early part of winter as practicable; say as soon as the wood is fully ripe. This pruning is simply cutting the canes back to within two feet of the ground.

The Second Season.—Whether a trellis should be put up now or let the vines run on the stakes depends on the richness of the soil and the growth the vines are likely to make. Be that as it may, they will only yield from about ten to thirty bunches of grapes near the ground. If left on the stakes, cultivation can be more thorough, as we can go both ways again.

I favor the stake plan for this year, letting from four to six canes grow, pruning and tying up as before. Rag strings will serve for tying; they are soft and do not cut the canes. The curl of the vines will soon catch and help support them. I have Concord vines now at this stage,

the year's growth measuring twenty feet. Think of what a wire trellis they will cover; twelve feet apart is none too far. I will use three No. 11 smooth wires, the top one eight feet from the ground, the bottom one two feet. This leaves me seventy-two square feet of trellis for each vine, besides the twenty-four inches below the first wire, which is often used by the vines that yield grapes. A vine like this will produce the third year from twenty-five to fifty pounds of grapes, at five cents per pound. In the former estimate my three hundred vines would yield me \$375 and in the latter \$750. The land they occupy is much less than an acre.

E. W. GEER,
Farmington, Mo.

SMALL FRUITS.

IMPROVING STRAWBERRIES BY SELECTION.

TO WHAT EXTENT IS IT POSSIBLE?

We often have questions from our fruit-growing readers who ask whether it is possible to improve varieties of strawberries by selection. Most strawberry growers seem to select their plants for setting, from matted rows, picking out vigorous plants only, of course knowing little about their pedigree. Some growers appear to think that the superiority of certain plants is due chiefly to their environment, that is, the culture and care which they have received. Our own observation seems to show that no plant or berry can be induced to continue to improve after it has reached ideal treatment, that is, after it receives just the food and moisture and other conditions that it needs. Then it seems to be at its best, and no amount of selection can improve it. Unless you give these best plants the best of care, they will deteriorate, and other plants taken from them will not be equal to them, unless they are equally well cared for. In other words, with the strawberry and most other fruits, is it not more a question of care and feeding than of pedigree?

Largely by Care and Feeding.—It is very difficult to answer the questions contained in your inquiry concerning the improvement of strawberries by means of selection. Two things are concerned in the problem: First, variation; second, selection, to perpetuate those varieties. Variations are induced by the environments in which the plants are grown; that is, good cultivation, poor cultivation, rich soil, poor soil, tend to make the plants different. As a matter of practice, we desire only those differences or variations which have been produced by good soil and good treatment. When these variations once appear, by selecting young plants from the old plants which please us most, we perpetuate that particular variation. I should say, therefore, in answer to your question, that strawberries are improved both by causing them to vary in the desired directions, and then by selecting the variations which arise. In my opinion, the variations are induced very largely by the care and feeding which the plants receive.

PROF. L. H. BAILEY,
Cornell University.

Strawberry Bud Variation Slight.—Bud variations have been shown to be common with certain plants, and to be often quite marked. This is true of apples, peaches and plums. With such fruits, improvement by bud selection is altogether feasible. I do not mean to recommend this means of originating new varieties in general; but it is well worth attention in keeping standard varieties up to standard. With the strawberry, bud variation is very slight, I suspect; at any rate, I never noted any special cases of it. In this connection, I was struck by a remark made by Mr. W. T. Macoun before the recent meeting of the Quebec Pomological Society. He said that, among a large number of strawberries in the variety test at the Central (Canada) Experiment Farm, last year, the old Wilson's Albany ranked first.

F. A. WAUGH,
Vermont.

M. Crawford's Opinion.—My opinion is that far too much has been claimed for selection. It is one of those theories than can neither be proved nor disproved. On all such questions, men are likely to have very positive opinions. In looking for evidence in support of either side,

one is very likely to see just what he wants to see. The man who believes that a horse chestnut carried in his pocket keeps off the rheumatism, or that a horseshoe over the door keeps off spooks, can not be convinced to the contrary; so the man who knows that selection is the great thing in strawberry culture, especially if he has plants for sale, can never be moved. These positive people have lots of followers, because the majority of people like to have some one to do their thinking, and so, truth has to be pushed aside for a time. I am not prepared to say that there is nothing in selection. The man who is thrifty, and selects well-known plants and nice, shapely potatoes, usually comes out ahead but these improved (?) varieties are very dependent on good culture. There should be a great difference in favor of plants that have been improved (?) for years by selection, but we do not see it. I do not believe it exists. I would suggest that the editor of "The R. N-Y. obtain some of these improved (?) plants and an equal number of the same variety from another grower who sells good, common, every-day plants, grow them side by side and report results.

M. CRAWFORD,
Ohio.

A Wisconsin Experiment.—The common practice of taking plants for setting from vigorous matted rows would not tend to develop strains of strawberries. This could be accomplished only by setting individual plants at considerable distances from each other, and permitting each one to form a family of runners. By comparing these families, we would be able to detect any differences in vigor or in other characteristics, and by selecting the family that comes nearest to our ideal, and planting the individual plants of this in other beds for further selection, we might, for all that has been proved to the contrary, develop a superior strain of any of our cultivated varieties. Prof. Bailey's theory that each bud is a distinct variety certainly offers encouragement for this line of work.

DRY WEATHER BERRIES.

Nearly every variety of strawberry has a natural preference for soil of a certain character. For light, sandy soils, Beder Wood, Bubach, Cumberland, Haverland and Michel have done best. Varieties best adapted to heavier soils are Brandywine, Clyde, Glen Mary, Leader, Lovett, Marshall, Parker Earle, William Belt. Crescent and Sharpless are without a decided preference for any particular soil. In the fields of many commercial growers, the following varieties have stood up bravely during continued dry weather; Beder Wood, Bubach, Crescent, Gandy, Meek, Marshall, Michel, William Belt. Those which are usually poor dry-weather varieties are Brandywine, Clyde, Glen Mary, Greenville, Sharpless. It must not be taken that these varieties will behave thus on your soil and under your culture. This grouping but indicates, in a general way, what their record has been the country over.

Of the two varieties, Bubach and Marshall, I should say that for the former, a naturally dry soil, a level gravelly loam would be better. Although Marshall has withstood drouth admirably in some places, notably at the Arkansas Experiment Station, it needs a deep, rich and rather heavy soil to bring out its superb qualities. Bubach has little to recommend it in the way of color and firmness, but excels in productiveness. Michel and Bubach have been for years the standard combination in Tompkins county, N. Y., and it has seemed to me that our commercial growers might find it profitable to introduce new blood into their strawberry patches. Some of the more progressive are now testing such varieties as Clyde, Glen Mary and William Belt. I would suggest a consideration of these before planting the old reliable somewhat inferior Bubach.—Rural New Yorker.

COST OF GROWING STRAWBERRIES.

Editor "Rural World:" Replying to your request in connection with a statement I made about the prices I had sold strawberries for in the west the past three years, would say that with the information I have from the leading markets of the west, the prices ranged from seventy-five

cents to \$1.25 per crate, gross sales, the average being about \$1 per crate.

I stated in the letter referred to, that strawberries could not be grown for less than \$1.50 per crate gross. So I figure it out that not a grower west of the Mississippi river has made any clear money on strawberries the past three years, excepting possibly on the mall patches grown for local markets and sold by the producer direct to consumer.

Beginning with the preparation of the soil, the purchase of plants, planting, cultivation and mulching the berry patch for winter protection, it will cost the grower from \$50 to \$55 per acre to grow strawberries. The average product of the large commercial berry grower is about two hundred crates per acre. More men grow less than two hundred crates.

There are exceptional seasons, like those of 1891 and 1897, where the product was over two hundred crates per acre, but during the interval between the good seasons the berry crops run from a third to a half and two-thirds of a crop. Last year there was only half crop, but owing to the largely increased acreage in two or three localities, where from forty to seventy cars are shipped daily, prices have not advanced, even in seasons when there were half crops of berries.

So I will stand by my statement, that \$1.50 per crate is the price that should be maintained from year to year if a berry grower would make an even race with ordinary grain and stock farming.

Now, to be fully understood, I may repeat that at the price of \$1 a day for labor, preparing one acre of soil for the plants, the cost of eight thousand plants, setting plants, cultivation and three tons old hay or straw at \$3.50 per ton for winter protection and plants at \$2.50 per one thousand it foots up over \$50 per acre. So my estimate of the expenses of crates, boxes, picking and hauling to the railway station is \$1 per crate to get a crate of berries laid down in express or refrigerator car. Then if the berry growers' returns are \$1.50 per crate clear of transportation and commission, and the yield is two hundred crates per acre, this makes a profit of \$100 per acre.

Now, if the berry growers will cut down their acreage within the bounds of reason and the demands of the market, remuneration for labor

will follow, but if growers continue increasing their planting as in the past three years in Missouri and Arkansas, great disappointment and loss will follow.

B. F. SMITH,
Douglas Co., Kan.

HOW TO USE NITRATE OF SODA.

H. T. A., New Jersey.—I would like to ask just how to apply sulphate of potash and nitrate of soda to strawberry plants. Some say that it will injure the plants if applied directly to them, and that it should be put between the rows. It seems as though the latter course leaves the fertilizer too far away from the plants.

Answer.—In our work with fertilizers and nitrate of soda for the strawberry, always applied broadcast, we have never had any injurious results. The first was applied early in the season, and the nitrate at blossoming time, when its action is to favor fruit development rather than leaf growth. Our conclusions were that it is inadvisable to apply nitrate of soda in connection with a fertilizer already rich in nitrogen. With low-grade materials, its addition is beneficial to the crop. The sulphate of ammonia has always given negative results except in the presence of lime. Do not apply when the foliage is wet. With a dry foliage or just preceding a rain, no injury should result. Applying before a rain insures its rapid passage into the soil, hence it is quickly available where otherwise it might lie on the surface for days, and with a little moisture, as dew, cause injury to the plants.

A. T. JORDAN,
New Jersey Experiment Station.

WATER AS A PROTECTION AGAINST FROSTS.

Last year there was a hard frost when the strawberries were in blossom and the plants were badly frozen just before daylight. I began to sprinkle them with the hose and before the sun was shining upon them I had drawn nearly all the frost out of the plants. They did not

escape some injury but think the water did much to save the crop. I think injury from frosts can be prevented in this way, but one should wet the plants and the ground thoroughly on a night preceding a frost, and then begin to sprinkle them soon after midnight, and continue the work until morning. For irrigating two acres, sixty rods of one and one-half inch iron pipe is laid on the surface of the ground and taken up in the fall. The tank is twelve feet long, six feet high and six feet wide, and is elevated on a high bank so that I get fifteen to twenty feet fall to the water used in the pipes. The cost of the plant was about \$100.

W. H. JENKINS,
Delaware county, N. Y.

BIG STRAWBERRIES.

Editor "The Southwest:" Mr. A. T. Goldsborough, of Wesley Heights, Washington, D. C., this year produced and exhibited some strawberries remarkable for size. The largest berry weighed four ounces and was ten and one-half inches in circumference. The total weight of six of these berries, which filled a quart box, was eighteen and two-fifths ounces. Some idea as to the size of them can be formed when it is known that a one-ounce berry is rarely seen in market. These would look like tomatoes. They were of a handsome bright crimson color with dark flesh. The weight is attested by the acting pomologist of the United States Department of Agriculture.

Being curious to know the process of producing berries so large, and having a pen-acquaintance with Mr. Goldsborough I asked him to tell me how he accomplished this remarkable success, and with what variety of plant. I give here a portion of his reply:

"I might say, pull off all fruits but four or five, but the time of thinning and which buds to remove, are essential to success."

Again: "I thin out the crowns; when four I leave two; but which must I leave—the outer, or the inner, and how must they be cut out? In other lines it is just as difficult to give a set rule.

"I use no artificial fertilizers for anything, and think them an unmitigated curse to the farmer and horticulturist. But plants must be

stimulated to get abnormal fruits, and how and when to apply rich earth and liquid manure would require a book, and then some essential would surely be left to the reader's judgment.

"Shade is another most important consideration. Too much would rot and mildew the fruit. Too much sun would ripen it too soon, for it must be held back as long as possible. Probably the best thing to tell you is to begin now. Pick strong layers, cut them away when they have roots about half an inch long, leave about one inch of old runner-string attached. Keep them growing till the ground freezes. Put them in prepared (?) soil where they are to fruit in September. Keep surface mulched from now on, but do not cover plants till the weather turns to the freezing point. Even then the covering should be removed in warm spells. I am sure that strawberry plants grow all through winter, if soil is not frozen. Let the variety be such as will stand rich feeding in the spring without increasing foliage. A good cow under high feeding responds with milk; she can't help it. A bad one gets fat. It is so with hens; one gives eggs, another fattens. Put lime on Bubachs and get fine fruit; put it on Bedar Wood or Crescent and get only foliage.

E. H. GRABILL,
Springfield, Mo.

BLACKCAP RASPBERRIES.

Written for "The Southwest:"

Methods of Propagation.—We know of but two, namely, by growing from seed and by tipping the end of the new growth. It is only desirable to grow from seed when new varieties are wanted with a hope of improvement. In growing by this method it is very important to select the very best plants obtainable of the two varieties you desire to cross. In selecting them remember that plants have individuality. No two are alike. In all berry plantations of any given variety a few will excel in growth of plant, in hardiness, size and quality of fruit. With all these points in mind go into your berry plantation when fruit begins to ripen, make your selections, mark the hills, make tips, select the strongest of these, plant them in the spring in rich garden soil, give

them extra care, cultivate and prune with an eye to perfection. When in bloom cross the flowers of the two varieties, save seed from finest berries and plant in rich soil, and from the seedlings produced select the plants that most nearly satisfy your ideal. Then continue on through succeeding generations till you obtain the variety you desire.

Second method.—Propagation by tips is the one in common practice from which our market is supplied with plants. In following this method secure your plants from a vigorous plantation of pure stock that has received proper care, cultivation and pruning, from some responsible party who knows how to grow, pack and handle good plants. The roots of raspberry tips are so young and tender that a few minutes exposure to the sun, wind or frost will ruin them, or, if improperly packed they will in a short time spoil from heating. For this reason buy as near home as possible, plant in spring on well drained, friable land sufficiently rich to grow eighty bushels of corn per acre, bring it up by well rotted manure thoroughly worked in by frequent plowing and harrowing. Land rolling enough to drain and not steep enough to wash is preferable. Prepare land before planting by deep plowing and thoroughly pulverize with harrow. Mark out rows with one-horse plow three or four inches deep, seven feet apart, and set plants three feet apart in row (2,074 plants per acre.) Keep plants in bucket covered with water and set with garden dibble so the crown of plant will not be more than two inches deep, and the roots as much deeper as they are long, or nearly so, and press the soil so firmly to the plant. Cultivate frequently and shallow, keep surface very fine. Remember that every day your land remains with a crust you lose fifty per cent of the growth.

Pinch out the top bud the first year when canes are fifteen inches high, the second and succeeding years at two feet. This will cause them to throw out numerous laterals for tipping, if it be desirable to make all the plants possible regardless of obtaining fruit, then pinch out the terminal bud of each lateral at twelve or fifteen inches, this will cause a second multiplication of laterals and very much increase the number of plants. Layering may be done at any time from the middle of July on through August. In putting down the tips bury the end of each young growth three to five inches deep, if the season is dry five inches, if wet

three will do. Put them in as nearly straight as possible, in regular order a few inches apart and press the earth firmly down.

If all these directions are carried out carefully you may make from twenty-five to two hundred plants to the hill, owing to age of plantation and variety, some multiplying much faster than others. The chief object of the propagator should be to grow good, strong plants of pure stock that will be worth \$15 per thousand (and cheap at that) rather than to cater to the demand for cheap plants at \$5 per thousand, that are too dear at any price. We have bought them at from \$25 down to \$5 per thousand, and the cheapest by far we ever got were those that cost us \$25 per thousand. Why? Because they were strong, vigorous plants and perfectly pure. All grew off finely, fruited abundantly and made us money. At present the trade is so demoralized by the sale of low priced, mean, sickly plants of an endless mixture of varieties that it is almost impossible to buy a thousand good, strong, healthy plants free from mixture of any given variety, even from the most honest and reliable nurserymen.

N. F. MURRAY,
Oregon, Mo.

SUCCESSFUL CULTURE OF GOOSEBERRIES.

Gooseberries do best on a clay soil which has been made rich by a liberal application of well-rotted manure. The soil on the timber bluff lands along the Des Moines river are just right, but even our rich land is not fertile enough to produce heavy crops. I find that few fertilizers surpass barnyard manure. I have also used as a mulch well-rotted straw, wood and coal ashes, leaves, vines and anything that could be gathered up.

After selecting the location I prepare my land by plowing and pulverizing thoroughly. I then mark out rows six feet apart, using great care to have them perfectly straight. With two horses and a large plow I furrow out and set my plants six feet apart in the furrow. The plants can then be cultivated each way. To some this distance may seem great, but I find from experience that it is much the best, as there is plenty of room for cultivation and the application of fertilizers. The space between the bushes can be utilized for growing beans, cucumbers, muskmelons, dwarf tomatoes and the like, as the vines remain green a long

time, thus affording shade and protection to the soil during the summer.

I prefer to plant in spring as soon as the soil is dry enough to work well, especially if the plants have been taken up the previous fall and heeled in over winter. Select hardy, vigorous bushes and take great care in setting. It is of the greatest care and importance to get a full stand, for plants that are put in later are at a great disadvantage and seldom do well. Properly prune both roots and tops before planting, lay the roots out straight in the furrow and cover with a fine, rich soil. With me cultivation is the easiest part. With a planet Jr or with a section of my steel harrow I can do the work to perfection at small cost. After the fruit is harvested and the vine crop, if any, is out of the way, I plow the longest way of the field with a diamond plow, throwing the soil to the bushes. In early spring I cultivate the other way and harrow, which levels the ground and prepares it for the small crops. The sooner this plowing is done after the fruit is off, the better.

As to varieties, I have found the Downing by far the best and most profitable for home use and commercial purposes. The plant is perfectly hardy and withstands our driest summers, is a sure cropper, producing fruit of fine appearance and good quality. It is also less troubled by insect pests than any other kind.—Orange Judd Farmer.

F. S. WHITE,
Iowa.

FALL PLANTING OF SMALL FRUITS.

Editor "Rural World:" Answering a question by a "Rural World" reader as to the relative merits of fall or spring planting, it depends entirely on various conditions such as the relative amount of time a planter has for the work during the fall or spring, the probable weather conditions during these seasons and the intervening winter, together with the character of the plants themselves. As a rule there is more time to do the work in the fall besides the spring season is usually so short that plants often start into active growth before the ground is in workable condition. In latitudes where the winters are long and the ground freezes early and deeply autumn planting is not as successfully practiced

as in places where these conditions are more moderate, unless the plants are thoroughly mulched at the time of transplanting. Autumn set plants should be able to make some root growth, before the ground freezes very much, in order to supply the comparatively small amount of moisture which evaporates through the twigs during the winter. Without this root growth plants will more or less exhaust themselves by the evaporation and be more likely to winter kill. Plants dug in the fall and held in or stored in cellars or otherwise protected during the winter lose but little by evaporation and by spring will be in much better condition than if planted in the open. If, however, the plants become well established by root growth before the extreme winter season it is nearly always best to do the work at that time, otherwise it is better deferred until spring.

Experiments are now in progress at the Missouri Botanical Garden to find out, so far as possible, the behavior of small fruits and various other plant when transplanted at different seasons of the year. So far as my experience and observation go strawberries taken up from one bed and reset in another without being out of the ground more than a few hours do best when moved in September or October; not later than November 1. If the plants are to come from a distance, however, early spring is far preferable. Blackcap raspberries are safer planted in spring unless carefully mulched with coarse litter at the time of transplanting in the fall. The other common small fruits, red raspberries, blackberries, currants and gooseberries seem to pass the winter in good condition even when planted as late as December 1 and make a better growth the following season than if planted in the spring. It is a safer plan, however, to do the work the latter part of October or first of November. —Prof. H. C. Irish, Missouri Botanical Garden, St. Louis, Mo.

WHEN TO CUT BACK SMALL FRUITS.

J. B. F., Scipio, N. Y.—I am trying to grow small fruits for home use, and don't know just when is the proper time to cut back the new growth on berry bushes, or to what extent they should be cut back to produce the best results on next year's crop. I would, also, like to know something about summer pruning of grape vines.

Answered by H. E. Van Deman.

There is no definite date at which it is best to head back the young canes of blackberries and raspberries; but the state of growth should determine the time to do the work. When the young growing canes are about three feet high, about three or four inches of the tip of each should be clipped off. It will be necessary to go over the rows several times, at intervals of about a week, for the canes will keep growing, and reach the proper height in about a month. The checking of the upward growth will cause numerous laterals, which are just what are needed. They should not be headed back until early the next spring.

Summer pruning grape vines is rarely beneficial. If they were properly pruned previously, when in the dormant stage, they will need very little or no pruning until the next fall, winter or spring. The plan that some viticulturists follow, of heading back grape shoots in the growing season, has been found by many of our best grape growers to be a detriment, if done severely, and of little service in any degree. One of the first things I learned to do on the big fruit farm where I spent several years learning practical pomology, was how to head back the bearing shoots when about two joints beyond the last bunch of grape flowers, and then later, to pinch back the laterals, and if we had time, the sub-laterals likewise. But such work is now generally considered useless in a practical way. The old idea was to throw the growth into the clusters of fruit, and so it does to some extent. But there is often too much intervention with nature's process of development, and the grapes are not bettered by it. It is, also, costly to do it carefully and thoroughly, and this is an item worth considering, in commercial vineyarding; but the amateur may count it a pleasant pastime, as it really is to him, if not busy with other work. All that I would now advise to do in the way of summer pruning grape vines, after over thirty years' experience and observation, is to rub or break out needless shoots early in the growing season, especially those along the main stem of the vine, or near the ground, and where barren shoots come out near the bearing ones, and to head back a few of the very rampant branches, after more than half their growth is made. It should be done more as a matter of convenience than with an expectation of bettering the fruitage.

The Pruning Book, by L. H. Bailey, is the best as well as the newest guide to correct pruning. Price \$1.50, postpaid, of the R. N.-Y.

CULTIVATION.

ORCHARD MANURING.

By E. P. Powell, New York.

So much mischief can be done by applying manures of the wrong kind in orchards that I doubt if we do not lose more by manuring than by neglecting to manure. Fruit trees do not require at any time barnyard manures, or their equivalent. What they require is a supply of inorganic food. You can do no better for apple trees than to supply them with coal ashes in which there is a liberal admixture of wood ashes. The coal ashes loosen the soil; the wood ashes furnish the fertilizer. If you can get a supply of old mortar you have just the thing you need. A mixture of lime and salt, when so mixed as to leave no free salt, is excellent for all fruit trees. All such manures should be applied as top dressing. A peach or plum orchard needs nothing better than swamp muck or earth from the woods with a slight addition of phosphate and potash.

If barnyard manure is applied at any time, it should be thoroughly decomposed and applied as a top-dressing. Such manure, if placed about the roots, when planting a pear or apple tree, will kill it. Grapes of course want phosphates and potash. They will also respond to a free application of liquid manures during their periods of rest, both in winter and in midsummer. All the tall growing berries, of the bramble sort, will use a large amount of organic manure. But be careful about dressing your raspberries with rank undecomposed barnyard manure. The probability is at any time you will develop a fungoid disease that you can not easily master. If you use barnyard manure in raspberries it should be thoroughly comminuted with the soil as a compost. In fact, I prefer to compost all manure before it is placed on my gardens. Equally important as the manure is the mulching of our fruit trees and bushes of all sorts.—Orange Judd Farmer.

CATCH CROPS.

A good succession of catch crops to sow between the regular crops is as essential to good farming as the selection of the main crops. It is often the neglect of these that makes farming so haphazard and uncertain. On old lands the catch crops are particularly important in keeping up the fertility of the soil to a proper standard. There are plenty of farmers who rarely give much attention to catch crops, but it is due to carelessness more than to any well considered conclusion drawn from experience.

The more catch crops that we can sandwich in between the regular crops in the course of the summer, the better will the condition of the soil be another season. These crops add to the soil the green fertilizing material that most lands need, and the more exhausting a crop is to the soil the more essential is it that the green plants should be plowed under every season. By paying proper attention to the catch crops we reduce our manure bill, and save work at other seasons of the year. It is really like killing two birds with one stone.

The leguminous crops are the best for catch crops on most soils, especially where clover will not make a good stand. Beginning early in the season, that is about the middle of May, when the corn is planted, the soja beans make an excellent catch crop. Either the dwarf or medium variety will do for this purpose. They should be sown first of all the catch crops, because they will thrive when the ground is too cold and wet for most of our other catch crops. Cow peas are excellent for sowing the latter part of May when the ground is warm. At this season of the year, and when used for a catch crop, the cow peas are useful not only in the south but in the northern states.

Canada field peas or crimson clover should be used for a catch crop during July and August. Both plants furnish plenty of green for the soil. In Canada rape is often sown in preference to either, and if the weather is good a large crop of green food will be supplied for fall use. Buckwheat is another good July catch crop that can be used on some soils to great advantage. Rye is the best late fall crop, and it can be sown any time from September to October. By preparing the ground in time for

these catch crops a perfect succession of them can be had at all seasons. As a rule, the leguminous plants are preferable to the others as catch crops. Most of the above belong to this class.—W. E. Farmer, of New Hampshire, in *Am. Cultivator*.

THINNING FRUIT.

The practicability of thinning fruit and its feasibility from a commercial standpoint, have been pretty well demonstrated in the last few years. In western New York it has generally proved profitable wherever tried. Mr. John Craig reports, in the publications of the (Canadian) central experimental farm, some results in thinning peaches and plums which corroborates the notes given from Mr. Beach and others. He concludes that, when a large crop of fruit is set, thinning peaches is highly remunerative for the following reasons: (1) It increases the weight of the yield. (2) It largely increases the size of the fruit. (3) It reduces the number of matured seeds, thereby considerably lessening the drain of the vitality of the tree. (4) It renders the crop less liable to rot. Thinning plums likewise proved altogether worth while.

GENERAL CONCLUSIONS ON THE FREEZE OF 1898-9.

A careful canvass of the whole field, with the assistance of the leading fruit growers of the state, leads to the following conclusions:

(1) That the lack of a protecting blanket of snow coupled with unusually low temperatures was the chief cause of the great loss of nursery stock and orchard trees.

(2) That inasmuch as trees on north slopes suffered more than trees on south aspects, and in proportion to the surface protection present, the intensity of frost bore a definite relation to the amount of injury inflicted.

(3) That conclusive data are wanting to show that more injury resulted on untiled orchard lands than on those supplied with tile drains.

(4) That orchard and nursery trees suffered most on exposed dry knolls with northern aspects than elsewhere.

(5) That the character of winter surface cover, in other words, desirable cover crops, is a question of paramount importance in northern Mississippi Valley States.

(6) That the matter of congenial and hardy stocks for plums, apples and cherries is a subject worthy the earnest attention of experiment station workers and nurserymen in the northwest.—American Gardening.

IMPROVEMENT OF PLANTS BY SELECTION.

In the year book of the Department of Agriculture for 1898, H. J. Webber has an article on "The Improvement of Plants by Selection."

Regarding the possibilities of persistent and methodical selection, Mr. Webber says:

"Formerly the proportion of lint in cotton to the seed, by weight, was about 1 to 5. Now it is frequently 1 to 3. Mr. W. A. Clark, a grower who bred towards a long fiber, has succeeded in increasing the length 25 to 30 per cent and sells his finest grades from selected plants at 50 to 60 cents per pound, while the ordinary product is quoted at 15 to 30 cents. This long fiber is used for adulterating silk and for other special purposes. In a similar manner another grower bred towards a heavier yield.

"The method of selecting is interesting. The progeny of a single carefully selected individual is cultivated in a plot by itself. The best plant is chosen for the next year. The seed from the plot sows about five acres, and this then furnishes the seed for the general crop the fourth year. But, since each year the finest plant is chosen from the five hundred for seeding the five acres, there is a constant tendency towards the ideal."

Again Mr. Webber says: "In selecting seed it is important that not merely the seed or fruit but the entire individual should be taken into consideration. Henri de Vilmorin says: 'I tried an experiment with seeds of *chrysanthemum carinatum* gathered on double, single, and semi-double heads, all growing on one plant, and found no difference whatever in the proportion of single and double-flowered plants.' If one were selecting seeds it would be better to choose from a plant which bore uni-

formly large fruit than to choose from one extra large fruit when the remainder on that plant were small. For this reason corn should be selected in the field from vigorous plants. Some individuals show a stronger tendency to revert to inferior ancestors. It is best to discontinue selecting from such plants and choose from another having the same desirable characters but showing less tendency to revert."—*Western Fruit Grower*.

INDIVIDUALITY OF TREES.

Prof. G. Harold Powell spoke on the underlying principles of variety improvement, saying in part:

No two plants in existence are exactly alike; each has its own individuality; even the branches on the same tree are not alike, or the buds on the same branch. The variable individual is the key to progress; the tree as a whole has a strong individuality; but the buds vary among themselves just as the trees in a nursery row, as no two have developed in exactly the same conditions. When we approach the problem of variety improvement we must know more of the secret of variety-making. In attempting the improvement of varieties, we must discover the habits of individuals—we must have a preconceived idea of the type we are striving for. Great changes have been made by selecting seed of specimens of given type in radishes, corn, tomatoes and other varieties of plants. Nature's object in crossing is to infuse new life into the specimens, and the plant-breeder may expect great results from his labors, in bringing out new and stronger varieties of plants and vegetables. Nature does not produce erratic forms here and there and expect them to crowd out every other form. But there is a great variation, even in the buds of every variety. The buds that show the greatest variation in form and habit are the ones of greatest interest and importance to the horticulturist, many fruits showing a decided deference in type of the same variety. In vegetables this is most marked in the potato family. Cases may be cited of apples on the same tree varying in type and color; a Roman Beauty apple tree of Ohio, bore apples much larger and had more spreading branches than usual. In like manner a Ben Davis, of Indiana.

had one limb bearing apples of much lighter color, and having the appearance of a separate variety. The quality in many cases varies quite as much on the same tree as the other characteristics. The plant-breeder will therefore not plant bushels of seed and throw away hundreds of seedlings before he gets a given type, but will rather watch the habit of given varieties of fruit trees, selecting given branches of a given type, and propagating from these up to his ideal.—N. J. Society; Country Gentleman.

ARE PEDIGREED PLANTS BETTER?

Editor Rural World:

In the spring of 1897 I got a dozen each of four standard varieties of strawberry plants, from one of the so-called "pedigree" plant growers who claim they have bred up certain old varieties and that their plants are so much superior to others. I wanted to see if there was really anything in them. The plants arrived in due time and the four dozen cost me nearly what I would have sold 200 at, and my plants would have been, on an average, twice as large—they were as sorry a lot as I ever bought. I throw away hundreds of better plants than one-half of these were. Still they were "pedigree" plants and sound, and I gave them a trial alongside of some of my own growing that I have had on the place or in my hands for ten or fifteen years, with the result that one-half of the "pedigree" plants failed to grow or died, after a feeble start, and those that grew did as well as any. When fruiting time came there was not an iota's difference that I could see. Of course, 1898 was a poor strawberry season, but the pedigree plants that should have proved their superiority failed to show it. Now I want to say this, the pedigree plant business is all right and may help to sell plants, but when we have a good berry crop we have good berries all along the row. In 1897 every variety in the place was loaded with perfect fruit, and if there were any deteriorated plants in these rows they could not have been detected by the expert pedigree plant sellers. I have had Bubach, Crescent, Jessie, Capt. Jack and other varieties for ten to fifteen years, and when we have a crop year we have berries on all the plants in the matted row. When

we have a poor year we find the same results on the entire row. If there really was anything in this pedigree plant fad we would find, perhaps, several feet of well fruited, then a few feet badly fruited plants, and so on, but in my twenty years of berry growing, I find when part of a row is good it is all good, and vice versa. Of course, some years some variety fails while others succeed.

I don't want to be understood as advocating the planting of small, scrubby plants taken from old beds, but if young, healthy plants are selected from one-year-old beds, they will not deteriorate and one can do his own preeding up by proper fertilization and cultivation.

Just one word more about our expert pedigree growers: They tell us that "a plant that is weakened by letting it produce fruit is not fit to grow plants from." Then, on the other hand, they say that they "grow their plants only from those that produce the finest and largest berries, and thereby improve the variety by weeding out all the deteriorated ones." My deteriorated idea is that as long as one gets large, strong, well-rooted plants, they are not deteriorated and need no breeding up, only as I have stated by proper fertilization and the best of cultivation.—H. Schnell, Howard county, Missouri.

FUNGI.

BITTER ROT IN APPLES.

Editor Rural World:

What is the cause of bitter rot in apples? What will prevent it? I have 3,000 apple trees, mostly Ben Davis, some of them fourteen years old, and bitter rot spoiled most of the apples.—John Sanders, Washington County, Ark.

Referring the foregoing to Prof. J. C. Whitten, of the Missouri Experiment Station, he replies as follows:

Editor Rural World:

Bitter rot is caused by a fungus, or minute parasitic plant, which grows and feeds upon the apple. At the Experiment Station we have been able to reduce the bitter rot one-half by spraying with Bordeaux mixture. This consists of six pounds of blue vitriol, six pounds lime and fifty gallons of water. Spray just before the buds open in spring, just before the flowers open, just as the last petals fall, and once or twice more, at intervals of ten or twelve days. Some have obtained good results by spraying twice just before the apples begin to ripen. If the diseased fruit is destroyed by hogs in the orchard or by gathering and removing the rotten apples, there is less liability of the disease spreading in the orchard.—J. C. Whitten, Horticulturist, Missouri Agricultural College, Columbia, Missouri.

THE APPLE CANKER.

Last February Mr. M. B. Waite, of the United States Department of Agriculture, communicated an article to one of our exchanges calling attention to an important disease of apple trees which he called canker. He noted its occurrence in western New York, in Pennsylvania, on the

eastern shore of Maryland, and in the James River county of Virginia.

Since the publication of Mr. Waite's note there have appeared two brief but important reports on this apple canker. These are both by Mr. W. Paddock, of the New York State Experiment Station at Geneva, and are published in the numbers of *Science* for October 28 and December 9, respectively. Mr. Paddock began experiments with this disease last spring, it having been called to the attention of the horticultural force at Geneva by orchardists in western New York, who have suffered severely from its ravages.

Mr. Paddock gives the following symptoms of the trouble: "This disease attacks the bark of the larger limbs, where all stages of development may be seen, from small sunken areas to the large cankers of many inches' extent. In aggravated cases a portion of the wood is laid bare. The bark becomes swollen and rough in all directions from the wound, so that the diseased limbs become quite conspicuous. These wounds produce an effect similar to girdling, and where many limbs are attacked the effect on a tree is disastrous." Unless one looks closely, the general appearance of the disease is something like what is commonly known as "body blight." The bark on the limbs or even on the trunk becomes black, and sometimes finally falls away. What seems to be the same disease, sometimes attacks trees near the ground and girdles them there. A limited number of observations seem to show this manifestation rather more common on Kings. Spitzenberg, which is known to be an unhealthy tree, is probably sometimes or often killed in the same way. Mr. Waite found the disease in western New York particularly severe on Twenty-Ounce, while in the south Early Harvest was worse affected. Further investigation will doubtless show that other varieties are specially susceptible, while certain ones enjoy relative immunity.

Mr. Waite reported that he had found a common fungus, *Schizophylum commune*, on the dead trees, and thought that perhaps it was the cause of the disease. Mr. Paddock's subsequent experiments have reached a different conclusion, however. He finds that the apple canker is caused by a well-known fungus, *Spaeropsis malorum*. This is the same fungus which has long been recognized as the cause of black-rot on the apple fruit (not scab). Further experiments have shown that the same fungus produces canker upon pear and quince. In his note Mr.

Waite suggested the wisdom of spraying to control this disease, and also the propriety of top grafting tender varieties on the trunks of immune sorts.

Thus far Mr. Paddock has not ventured any practical application of his discoveries; but it is plain that they are likely to be of considerable consequence to fruit-growers. The apple canker appears to be doing a deplorable amount of damage, even though in many cases it was hardly suspected. This damage can apparently be diminished by spraying intelligently directed against it. Many orchardists have already noted that careful spraying helps the health of their trees; and now they may perhaps soon be given a new motive and a new reason for spraying, with new directions for meeting a new enemy. These preliminary notes on apple canker seems to us to be of unusual importance.—From Country Gentleman.

CEDAR APPLE FUNGUS.

Professor J. C. Whitten, Columbia, Mo.

Dear Sir:—I was called to Conway, in the western part of this county, to examine an orchard in which were found the diseased twigs which I enclose to you. What is the disease and what the prevention? It looks as if the trees would be seriously damaged, if not destroyed, if a remedy is not applied. These twigs came from an old York state variety, the Twenty ounce apple. A Rome Beauty and these two Twenty ounce apple trees are in the same condition. Have your report of the disease or trouble published in the "Rural World."—A. Nelson, Laclede Co., Mo.

Editor "Rural World:" Specimens of apple leaves have just been received that are very badly infested with a peculiar disease. The upper surfaces of the leaves are badly discolored by orange colored blotches one-eighth to one-half inch in diameter. These blotches sometimes become almost scarlet and the leaf seems to be entirely dead in the vicinity of each blotch. The under side of each blotch looks scurfy and produces small warty horns one-sixteenth of an inch long, closely clustered together.

This is the apple leaf rust or cedar apple fungus (*Roestelea pirata*) which, if abundant, may be very destructive to the apple leaves. It is one form of the same fungus which causes the cedar apples, or cedar ball, on the red cedar. This fungus having two forms to complete its life history, is very interesting. The spores shed from the form causing the rust on the apple (or sometimes on the wild haw) are shed in great numbers. Instead of germinating again on the apple leaf they find their way to a cedar tree and there germinate, causing the cedar apple. The cedar apple in turn sheds its crop of spores in May or early June, and these spores find their way back to the apple, where they again form the leaf rust. If all the cedar trees in the vicinity of the orchard are destroyed, or if the cedar apples are picked and destroyed in winter, the leaf rust will not persist for many seasons on the apple. It is probable, however, that the apple rust form has the power to reappear for a time without alternating, by means of spores on the cedar tree. Spraying the apple trees with Bordeaux mixture, the same as for apple scab, is said to check the leaf rust. We have not tried this remedy at the Experiment Station, as the rust has not appeared in the station orchard.—J. C. Whitten, Horticulturist Mo. Exp. Station. Columbia, Mo.

ENTOMOLOGY.

SPRAYING OF ORCHARDS.

Richview, Ill., Sept. 19.—Many fruit-growers in this section of Illinois have been spraying their orchards, with a view of killing insects, says a "Globe-Democrat" correspondent. J. W. Stanton, president of the Southern Illinois Horticultural Society, says that the past season had given strange results in spraying. "In many instances," he declared, "spraying seems to do no good. I do not know why there were so many unsatisfactory experiences, but this does not lessen the fact that bugs and fungi should be killed. That spraying pays is as well demonstrated as

it is that the apple worms, caterpillars and blight are injurious. From experience and observation this season, I am convinced that the most thorough spraying with proper material for one year, will not always bring satisfactory results, but I have ample proof that spraying properly each year will bring satisfactory results. After the injury is once checked we have learned the importance of proper spraying and at the proper time; otherwise, it is safe to predict unsatisfactory results, and the conclusion that spraying does not pay. I have visited orchards this season which have been sprayed for the past three years, and found a large per cent of No. 1 apples, while orchards adjoining of the same age not sprayed were a light crop and poor quality. Cultivation of the orchard is also proving an important question, which in some sections of southern Illinois may explain the fact that there is no crop this season. Too often orchardists attempt to grow red-top and apples on the same ground. I find this practice in the counties having the largest orchard interests in southern Illinois. They have very few apples this season. In my opinion the time has come when the successful orchardists must spray every year, must master the reasons and principles and apply them as circumstances demand.—Colman's Rural World.

We would advise our readers to save the following formulas in some way, as they will perhaps come in handy during the coming season, and no doubt be referred to from time to time in this department:

Bordeaux Mixture.—Copper sulphate six pounds; quicklime, four pounds; water, forty gallons. Dissolve the copper sulphate by putting it in a bag of coarse cloth and hanging this in a vessel holding at least four gallons, so that it is just covered by the water. Use an earthen or wooden vessel. Slake the lime in an equal amount of water. Then mix the two and add enough water to make forty gallons. It is then ready for immediate use. For rots, molds, wildews, and all fungous diseases.

Ammoniacal Copper Carbonate.—Copper carbonate, one ounce; ammonia, enough to dissolve the copper; water, nine gallons. The copper carbonate is best dissolved in large bottles, where it will keep indefinitely,

and it should be diluted with water as required. For same purpose as Bordeaux.

Copper Sulphate Solution.—Copper sulphate, one pound; water, fifteen gallons. Dissolve the copper sulphate in the water, when it is ready for use. This should never be applied to foliage, but must be used before the buds break. For peaches and nectarines use twenty-five gallons of water. For fungous diseases.

Paris Green.—Paris green, one pound; water, two hundred and fifty gallons. If this mixture is to be used upon peach trees, one pound quick-lime should be added. Repeated applications will injure most foliage, unless lime is added. Paris green and Bordeaux can be applied together with perfect safety. The action of neither is weakened, and the Paris green loses all caustic properties. For insects which chew.

London Purple.—This is used in the same proportion as Paris green, but as it is more caustic it should be applied with the lime, or with the Bordeaux mixture. Do not use it on peach or plum trees. For insects which chew.

Hellebore.—Fresh white hellebore, one ounce; water, three gallons. Apply when thoroughly mixed. For insects which chew.

Kerosene Emulsion.—Hard soap, one half pound; boiling water, one gallon; kerosene, two gallons. Dissolve the soap in the water, add the kerosene, and churn with a pump for five to ten minutes. Dilute ten to fifteen times before applying. For insects which suck, cabbage worms, and all insects which have soft bodies.—Cornell University.

FROM PROF. STEDMAN.

The subject of spraying for insects in an orchard may be briefly stated as follows: In the first place be sure you know whether you are dealing with a biting (eating) insect or with a sucking insect. Upon this point depends the remedy, and right here is where hundreds of good horticulturists make a mistake. It is useless to apply a poison spray for a

sucking insect, and is almost always useless to apply the remedies for sucking insects against the biting.

Having determined the insect to be a biting (eating) one, you should use some form of arsenical poison. For all but peach and plum trees the best substance is Paris green (be sure and get pure material). For insects that require only one or two sprayings, like the canker worm, use one pound of Paris green, three pounds of fresh lime and one hundred and fifty gallons of water. For insects that require many continuous sprayings, like the codling moth, use one pound of Paris green, three pounds of fresh lime and one hundred and seventy-five gallons of water. Never make this spray weaker or stronger for codling moth, since more water than the above will reduce the poison so that you will not kill the proper amount of insects, and if there be less water used the repeated sprayings are apt to injure the foliage; therefore, use exactly the above proportion. In all cases be sure and keep the Paris green mixture constantly stirred while spraying, since Paris green does not dissolve in water. Always spray thoroughly. Always repeat a spraying if it rains within a few days after spraying.

Where one wishes to spray peach or plum trees, or when one wishes to apply a strong arsenical spray, the following should always be used: Powder and dissolve in a bucket of water four ounces of arsenate of soda and eleven ounces of acetate of lead, and after it is all dissolved let it stand over night, and then add it to water—from twenty-five gallons to one hundred gallons, according to strength desired—and then add two gallons of glucose and thoroughly dissolve and mix. This is known as the arsenate of lead spray, and will not injure any trees no matter how strong it may be used, and is death to all biting insects.

Having determined the insect to be a sucking one, you should apply nine times out of ten, what is known as kerosene emulsion, which is made as follows: Dissolve one-half pound of hard soap in one gallon of boiling soft water, then add two gallons of kerosene (coal-oil) and churn the mixture for ten minutes by means of a force pump—pump the liquid back into itself, using a solid-stream nozzle—by which time you will have a thick, creamy emulsion which will be about one-third larger in bulk than you started with; then add nineteen gallons of water to the above and stir thoroughly. Apply this to the plants by means of a

spray pump, and since it kills only by contact, it is necessary to touch each insect in order to kill it and hence the work must be done thoroughly. It will not kill insects that may come along after the spraying is done as will the arsenical spray. Aphis, or plant lice, are easily killed by this spray, but are also killed by a spray of tobacco tea. Of course the spraying should be done before they curl the leaves up.

Paris green and lime may be added to this kerosene emulsion and thereby combine the spray for both biting and sucking insects. This is done by simply regarding the kerosene emulsion as so much water.

When one is spraying with Bordeaux mixture for fungus diseases the Paris green may also be added as though the Bordeaux mixture were water, and again save the trouble of two sprayings.—Dr. J. M. Stedman, Entomologist, A. & M. College. Columbia, Mo.

HOW INSECTS SPEND THE WINTER.

THEY DODGE JACK FROST AND TURN OUT READY FOR BUSINESS.

Where are They?—Where are the insects which harassed the farmer, fruit-grower, gardener or house-wife last summer? Doubtless some of us would dismiss this question with the notion that the insects are killed off by the rigors of winter, perhaps to be reincarnated, by spontaneous generation or otherwise, in the spring. It is true that many insects do succumb to zero weather, yet mother nature always sees to it that even such insignificant (to many) creatures as the insects make ample provisions for getting through the winter in some form, even among "Greenland's icy mountains." Doubtless no kind or species of insect was ever exterminated from the earth in historical times because of inability to withstand winter weather.

Frozen Insects.—One may ask. Can insects survive freezing? There are several records by careful observers of spiders, grubs and caterpillars being found frozen stiff in northern latitudes, so that they would break like icicles; and yet when these were thawed out gradually they would "come to life," as it were, and be all right. It is very essential that there be a gradual thawing out, hence insects suffer greater mortality

during a winter in which there are frequent sudden and extreme changes of temperature.

In the case of some insects, at least, they will withstand very low temperature without freezing. With the thermometer registering several degrees below zero, I have pricked the thin shells of the little black eggs of the common green apple aphid, which are laid in the fall on the bark of the apple tree, where they are exposed to all the rigors of winter. From every egg I thus pricked the juicy contents ran out as freely as on a warm day in November. These facts show that it is possible for insects to withstand the severe cold of winter or to hibernate.

Sound Asleep.—Generally speaking, insects do not feed during the winter; they truly hibernate. Of course, this statement applies only in cold wintry latitudes and to outdoor insects. We will discuss the indoor insects shortly.

There are, as many understand, four different stages in the life-cycle of many insects. First, the egg stage, which is the starting point in the life of all insects; second, the caterpillar, grub, or maggot stage; third, a quiescent pupa stage, when the insect makes itself over from a caterpillar, grub, or maggot, into a butterfly, a beetle, or a fly; fourth, the adult insect. Hibernation among insects may occur in any one or more of these four stages. Usually an insect passes each winter in a certain stage, but some go into hibernation in two of these stages.

Indoor Insects.—Every housewife is glad when the frosts of autumn put an end to the house-fly warfare. As the house-fly's favorite breeding place is horse manure, which does not afford a congenial feeding ground in winter, the pest is obliged to hibernate. Sharp eyes may find some of the flies snugly tucked away in the cracks and crannies of our houses and barns. Usually several of these wintering individuals will be thawed out whenever a spare bedroom, public hall, or church is warmed. When the whole house has to be warmed for the children's home-coming for the holidays, some of last summer's house-flies will, doubtless, wake up from their winter's nap in a window crevice and take a nibble at the Christmas turkey. A few pestiferous mosquitoes may also be on hand, as they hibernate in similar situations.

Mosquitoes breed in standing water, like rain barrels, water-tanks, pools, etc., hence Jack Frost forces the adult mosquitoes to hibernate, unless they can find a tank or cistern of water in a warm attic, cellar, or elsewhere, where they might continue to breed during the winter. Clothes moths keep on breeding in ordinary closets and warm storerooms; a temperature of forty degrees F. will prevent the moths working, hence valuable furs, etc., are now often placed in cold storage during the summer. The insects which infest stored grains and seeds usually breed much slower during the winter, and may cease to feed if stored in quite cold places.

Outdoor Insects, however, rarely if ever, eat during the winter. The Apple and the Forest tent-caterpillars were very numerous and destructive in 1898 in many parts of the country, yet how few of those who suffered from their ravages have a thought or a care as to how or where these pests are wintering. In the case of each of these insects, the caterpillars transformed into millers or moths late in the summer, and these moths laid a large mass of eggs around the smaller branches of the trees upon which their progeny are to feed in 1899. These tent-caterpillars, then, are now hibernating as little baby caterpillars, all ready to burst through the egg shell, and begin eating the opening buds in the spring. Encourage the children to look for the curious varnished egg-masses of these tent-caterpillars this winter. Cut off every twig bearing one, and after the children have had a good look at the eggs and the little furry caterpillars in them with a pocket lens or microscope, then, and not until then, burn the egg masses.

Some Apple Pests.—In 1898, at least four thousand acres of apple orchards in western New York were stripped of foliage by canker worms; at least five different kinds of canker worms were engaged in this destructive work. In the case of three of the kinds, the moths emerged from the ground during November and December, crawled up the trees, laid their quotas of eggs on the bark, and then died, leaving it to the eggs to carry the species through the winter. In the case of the other two kinds, however, they are now asleep as little brown pupae in the soil under the trees; they will awake as months during the first warm days in March or April, and crawl up the trees, lay their eggs, and then die.

About \$3,000,000 worth of "wormy" apples and pears are grown in New York state every year. How many know where the codling moth or apple worm, which causes this great loss, spent the holidays this winter? The same worms or caterpillars that made the fruit "wormy" last fall, are now in hibernation; thus, in the case of this common insect pest, the winter is passed as a caterpillar. Where? Soon after the worm leaves an apple, it spins about itself a tight, rather dense cocoon of silk, within which it hibernates. If the worm does not get full-grown and leave the fruit until after it is barreled or put in storage, its cocoon or winter home will be made in the most convenient crack or cranny in barrel or storeroom. If the worms escape from the fruit while the latter is on the tree or on the ground beneath, then most of them find their way to the trunk of the tree, under the loose bark of which they spin their winter home. Thus many of the same worms which infested apples and pears in 1898, are now to be found on the trunks of the trees snugly tucked away in a silken home of their own construction. I doubt whether they are frozen in these tight, warm homes; but many of them do not escape the sharp eyes and bills of the birds which spend the winter with us; there are many "ups and downs" in an insect's life.

Plum Curculio; Pear Psylla.—Another inveterate enemy of the fruit-grower is the Plum curculio. The curculios which stung the fruit last spring, all died before July, but from their eggs were developed grubs, which went into the ground, and there transformed through pupae, Plum curculios or beetles. These curculios emerged from the ground in July and August, fed for a time on the plum or other foliage, and then in September or later sought a sheltered spot where they might spend the holidays and the rest of the winter in a quiet sleep, undisturbed by prowling enemies. Plum growers have noticed that they catch more curculios in the spring on those plum trees nearest a patch of woodland or a hedgerow of some sort; this is because such places offer ideal hibernating quarters for the curculios. Thus this insect passes the winter in the adult stage, and the curculios which will sting the fruits in 1899, were born in July or August, 1898, and have withstood the attacks of Jack Frost during one winter.

Papa and mamma pear psyllas are now hibernating in the crevices of the bark on the pear trees. Mother nature is depending upon these to start the broods of young nymphs or baby psyllas which will suck out the life of many pears, and even of some whole trees, in 1899. The above instances are only a few of the many among our well-known insect foes, which might be cited to illustrate the varied and interesting methods pursued by these little creatures to get through that portion of the year when almost everything is in the clutches of Jack Frost. Insects have no Christmas or New Year to look forward to during this cold period, and there is no Santa Claus to arouse curiosity and wonderment in their sleepy little brains.—M. V. Slingerland. *Rural New Yorker.*

BISULPHATE OF CARBON AND TREE-ROOT LICE.

At a recent meeting of the Ohio State Horticultural Society, Prof. Webster stated that he had experimented with bisulphate of carbon to exterminate lice on the roots of trees. Invariably when he applied sufficient bisulphate of carbon to kill the lice the tree also died. The professor remarked that the ants burrow down along the trunks of the trees, then follow the larger roots until they arrive at the soft and tender root-lets and there deposit the lice.

In regard to fumigation Prof. Webster remarked: "I would rather have a certificate of fumigation of nursery stock than one of inspection." The professor exhibited a model house for fumigation. He cautioned the audience to be very careful on account of the deadly invisible gas employed. The hydrocyanic gas used is formed by dropping potassium cyanide into sulphuric acid and water. The moment these two ingredients come in contact they form an invisible deadly vapor. The model house that the professor exhibited was so constructed that the danger from mixing was avoided.—*Prairie Farmer.*

FUMIGATION.

State Entomologist W. G. Johnson in his report referred to the fumigation of nursery stock, and stated that thirty-four fumigation houses are now in operation, and others being constructed. The provision of the law making it compulsory was inserted by the nurserymen themselves, and the increased sales resulting from it have shown its advisability. In the forty-six nurseries of the state there are over 4,000,000 standing fruit trees and 30,000,000 small fruit plants. The new bud mite which has been so destructive to peach nursery trees was described and specimens of its work exhibited. The San Jose scale was reported under control in the nurseries, and occurring in one hundred and forty-one localities throughout the orchards of the state. A new insect, probably of the genus *Dactylopius*, has been found injuring the roots of the Kieffer pear quite seriously.

State Pathologist C. O. Townsend reported that during the season some three hundred orchards, aggregating over 500,000 trees had been inspected for yellows, and all infested trees had been or were being removed. The peach rot has been very destructive the present season, causing a loss of about one-fourth of the crop. Peach-leaf curl, pear blight and apple scab were reported as doing considerable damage. The fact is that Maryland growers have not properly appreciated their friend the spray pump, and fungous diseases have in many cases gained the upper hand.—Maryland Hort. Soc.—Country Gentleman.

WINTER SPRAYING FOR PEAR INSECTS.

Two of the most common and injurious insect pests of the pear tree may be largely controlled by a proper spraying while the trees are dormant during the winter.

PEAR-LEAF BLISTER MITE.

One of these is the pear-leaf blister mite. The reddish blister which appear on the leaves in spring and later on turn brown and become thick and corky, do not seem to be a serious injury to the tree, other than in

causing the foliage to drop much more quickly than usual in the fall. But when the disease is abundant, the foliage will often drop in mid-summer, especially upon young trees or those in the nursery. It is upon these that the injury is most apparent, preventing a good growth and, when occurring year after year, quite seriously stunting the tree. It must always be remembered that a tree's leaves are as necessary to its growth as are the lungs to a person, and the moment it is deprived of them, just that soon growth must cease.

The blisters are caused by a very small mite, invisible to the unaided eye, somewhat nearly related to the common red spider. It lays its eggs within the blister and upon hatching the young mites first enlarge their home cavity and then migrate to other portions of the leaf or preferably to the more tender leaves of the new growth, where they form other blisters. Thus the blisters, or galls, are rapidly multiplied during the summer. As the leaves commence to drop, the mites leave them and hide under the scales of the fruit buds, where they remain over winter. It is at this time that they may be successfully attacked by spraying the trees with strong kerosene emulsion or a mechanical mixture of kerosene and water as made by the "kerosene attachments" of the newer pumps. Careful experiments made by Prof. M. V. Slingerland at Cornell University have shown that kerosene emulsion diluted with from five to seven parts of water will be entirely effectual against this pest. This would be equivalent to from fifteen per cent to twenty per cent of the kerosene and water mixture. Trees should be sprayed from all sides, using special care on the terminal buds.

LADY-BIRD BEETLES VS. THE SAN JOSE SCALE.

The value of common Lady-bird beetles as destroyers of injurious plant lice and scale insects is not appreciated as it should be, for very frequently they are killed by persons who think them injurious.

Besides the little orange or red beetles, spotted with black, which are ordinarily known as "Lady-bird" or "Lady-bugs," there are a number of forms included in this family of beetles, the Coccinellidae, which are colored exactly opposite to the others, being of a brilliant black,

marked with yellow or red. Most of these latter forms feed on scale insects, while those with the black spots live mostly upon plant lice.

Never has the true worth of these insects been better shown than by the persistent way in which they have met the invasion of the San Jose scale. For a time it seemed as if the fruit-grower was to be obliged to do battle with this pest singlehanded, but old Mother Nature always comes to his assistance in such cases after a time, and this instance was no exception. Hardly had the San Jose scale commenced to get a start in the east before it was attacked both by internal parasites and the predaceous Lady-bird beetles. Of the latter, but two species are commonly found on scale infested trees in the east.

The most conspicuous of these is the Twice-stabbed Lady-bird, *Chilocorus bivulnerus*, which receives its name from the two blood-red spots on its wing covers. This is not usually as numerous as the species next mentioned, but is much larger and will thus consume more scales. In one orchard which I recently examined, where three thousand trees had been removed on account of scale, a block of several hundred five-year peach trees, which eighteen months ago were badly infested with the San Jose scale, is now practically free from it and it is with difficulty that a scale is found. This has been almost entirely due to the good work done by the Twice-stabbed Lady-birds, which have been very numerous in the orchard and were found in it this year very early in the spring, before most other insects had left their winter quarters. This species is widely distributed and is common in almost every orchard.

Even more efficient are the little black beetles, known as *Pentilia misella*. They are but a sixteenth of an inch in length and are not found in all parts of this state, at least they have not been noted in all of our scale infested orchards, though widely distributed throughout the east, but when they do occur they soon become exceedingly numerous. Both larvae and adults of this and the last species feed upon the scales, the beetles seeming to prefer the adult female scales. Where the scale has been reduced by spraying these little beetles are very useful in exterminating those scales remaining; for when the scales were numerous the beetles also became plentiful, but were not destroyed to any extent by the spraying, so that a large number of them are waiting to pounce upon the surviving scales. In such instances I have several times found trees in

which the leaves were fairly covered with these beetles and their larvae. Even in midwinter these beetles are found feeding upon the scales in this latitude.

It will hardly be wise to leave the subjugation of such a pest as the San Jose scale to its natural enemies, however efficient they may be in reducing it. No pains should be spared to rid the orchard of it either by spraying or washing the trees, or by fumigation, but it is worthy of note that like all of our injurious insects it has its natural enemies which very often are themselves sufficient to keep it in check and should always be protected and spread in every way possible.—E. Dwight Sanderson, Md., *Am. Gardening*.

TO DESTROY CHINCH BUGS.

W. A. IRVINE TELLS HOW THE DREADED ENEMY CAN BE DESTROYED.

With the outlay of a little money and labor the chinch bugs that invade fields of corn and wheat can be annihilated. These bugs have destroyed millions of dollars worth of grain. Volumes of advice have been printed by practical and scientific men on how to kill the enemy. For the benefit of the people we give the practical experience of one of our fruit growers:

W. A. Irvine, of Springfield, who has a young orchard of sixty acres, has forty acres in corn; on each side of this corn field was a wheat field. From these fields an army of chinch bugs invaded Mr. Irvine's corn. Five rows had been destroyed before the owner realized the danger to his crop. He mixed sour milk and kerosene oil in equal parts, putting the milk in a tub, turning the oil into the milk slowly and stirring thoroughly until he had a perfect emulsion. He had his workman sprinkle all the corn on which there were bugs, using an ordinary water hand sprinkler. The bugs were killed by millions. To make sure work he went over the corn a second time. The field is rid of the bugs. He saved \$160 by the expenditure of \$1.60. The bugs had only got to the fifth row in the field on the side they were strongest.

Chinch bugs move by columns, they don't light over a whole field at once, hence the emulsion can be applied with a sprinkling pot. The corn was not injured at all by the application.

Now, this is a simply remedy. It is a sure one, costs but a trifle. We believe it will pay to spray fields of wheat or any crop that is being injured by chinch bugs. Of course where a large field is covered with bugs the hand sprinkler will be too small, but the vigilant farmer will not let an invading host move from row to row if he can help it.

How many will try the above remedy? It is preferable to scattering diseased bugs—it is quickly done.

It would be a good plan, says Mr. Irvine, to burn the leaves in the spring in the woods that border on fields that have been infested with bugs, as millions of them winter there.—Southwest.

ORNAMENTALS.

ORNAMENTAL HORTICULTURE.

As a rule we do not place sufficient value upon the purely ornamental side of farm life. Country property would be greatly improved if farmers would consider the looks of the house, gardens and fields a little, and indirectly they would gain thereby. A farming country that is pleasing to the eye always attracts more people to the region, and the near-by market for produce is thus built up. Railroad companies appreciate the value of this by offering prizes frequently for the prettiest farm on the line of their route, which can be viewed from the car windows. They also pay considerable in prizes for the best grounds around their depots. Manufacturers likewise are trying to make their factories attractive by cultivating trees, flowers and shrubbery on the grounds. Altogether many of our most successful business men

attach more importance to the value of ornamental gardening and horticulture than the average farmer.

Ornamental horticulture need not be a waste, either. It is possible to combine with it profitable work that more than pays for the outlay of time, money and labor. Thus in some places there is a demand for cut flowers, so that the farmer who raises plenty of fine specimens in the front garden can sell them at a fair price. But flowers are not the only ornaments. Many of our fruit trees present pretty sights at all seasons of the year. What is handsomer than a garden of fruit trees in the blossom season, or again when the fruits are ripening? Such a sight is admired by anybody. Even vines lend attraction to the place.

The taste in arranging these fruit trees will decide the value of the ornamentation. If one has an eye for the beautiful he will cover up ugly spots in the landscape, and arrange his trees so as to intensify any particular bright place. It costs no more to do this than to plant the trees and vines in a haphazard way. The house and barns can be changed materially by training a few vines, flowers and shrubbery around them. It may not be possible to find a money market for the fruits thus raised, but they will supply the table with something that is always desirable, and that is not always the case on every farm.—James Ridgway, Wisconsin, *Am. Cultivator*.

AN AUTHOR'S FLORAL INFATUATION.

In "Gloria Mundi," the late Harold Frederick's late novel, which appeared soon after his death, there occurs the following curious autobiographical confession as to the writer's cultivation of flowers: "I wish I had the courage to give it up altogether. It murders my work. I spend sometimes whole hours in my greenhouse when I ought to be doing other things. The worst of it is that I realize perfectly the criminal waste of time—and still I persist in it. There is something quite mysterious about plants—especially if you have grown them yourself. You can go and stand among them by the hour, and look from one to another, with your mind entirely closed to thoughts of any description. I used to assume that this mental rest had a recuperative value, but as I get older I

suspect that it is a kind of lethargy instead—a mere blankness that can grow upon one. I find myself, for example, going incessantly to see certain pans of my own hybridized seedlings, and staring aimlessly at them till I get quite empty-headed. Now, I am too busy a man to be able to afford that.”

In answer to the question, How can the Farmer or Fruit-Grower keep a large Lawn in Condition with the least outlay of Time and Money?—L. B. Pierce would first divest the lawn of stone piles, rose bushes and suckering shrubs; also of misplaced flower beds. Group such shrubs as may be desirable upon the outskirts of the lawn and place wild-flower borders and those designed to hold flowers, other than bedding plants, away from the house and walks. Limit the flower beds in size, placing geraniums and coleus close to the dwelling, as these can be kept neatly with a little trouble, while the others will not require close attention and had better be on the outskirts. If the lawn is quite large and needs additional ornament, use cannas and Japanese grasses, which require very little care.

If the lawn requires smoothing up, draw rich soil from plowed fields in late autumn and fill depressions, making all smooth in the early spring. Grass will grow through two inches of filling, and if more is needed, do it in succeeding autumns. This advice is especially applicable to old dooryards with large trees, where plowing and reseeding is difficult or next to impossible. It takes a good deal of soil sometimes, but, if done when other work is not pressing, costs comparatively little. Having got the lawn smooth and free from obstructions in large open areas, get a good lawn-mower and a can of lubricating oil. It will next be in order to hypnotize or bulldoze some member of the family until he or she had rather mow lawn than eat dinner. If the hired man smokes, a free use of stogies and “two-fers” will bribe him into extra hours with the lawn-mower, and sometimes seven cents’ worth of cigars will produce more than a dollar’s worth of labor. As each heart knows its own bitterness, so each family will in time settle upon the individual who shall become a lawn-mower slave, and happy it is if the slave has so much enthusiasm as to be unmindful of the bondage.—Before Ohio State Society, Country Gentleman.

OUT-DOOR ART.

Prof. W. J. Beal, Lansing, Mich., read a paper upon "Out-door Art in School and College Grounds," and advised the use of trees and shrubbery to embellish the grounds, but laid particular stress upon collections of weeds, grasses, and the native trees and shrubs. The "wild garden" at the Michigan Agricultural College contains most of the plants found in that section, and is useful and attractive both to students and visitors. The authorities of the Michigan State University and the two Normal schools have been so pleased with the idea that they have established similar gardens and it is expected, as their students go out into the state as teachers in the public schools, that, here and there, similar, but of course, smaller gardens will be started in the grounds of the district schools.

Prof. W. W. Tracy, of Detroit, had for his topic "Interesting Children in our Highways and Public Grounds." He believes that the love of beauty is inborn and that it is a crime not to give it a chance to develop. Many children gather armfuls of flowers but it is more often from a commercial spirit as they hope to sell them, than for a love of the flowers themselves. Much can be done by giving children a bit of land in which to grow such plants as they wish, and if they can be induced to aid in beautifying some waste place, they can hardly fail to take an interest in the work.

Mr. Olmsted confirmed the last statement by relating the experience in Cambridge, Mass., where there are school gardens in many of the grounds, and the teachers have interested the pupils in the triangles and squares in the vicinity, and they are not only careful themselves to avoid injuring the lawn and shrubbery, but they warn others from doing so.—Am. Park. and Out-door Art Ass'n, American Gardening.

ORNAMENTAL STOCK.

There have been added lately to the literature relating to trees and plants for ornamental purposes several important works. One of these is the annual report of the Tree Planting and Fountain Society of Brook-

lyn, N. Y. The work of this society is like that of the New York Tree Planting Society to which reference was made in the December issue of this journal. The report is a volume of one hundred and thirty-two pages replete with information to tax-payers regarding the desirability of trees in city streets together with details concerning varieties, the planting, and general care of such trees. A. A. Low is president, Paul Leicester Ford vice-president, and Lewis Colling secretary of the Brooklyn society. The secretary states that as the result of the society's efforts the people have given more attention to arboriculture, and nurserymen are preparing better stock, not only in quality, but also in kinds, to meet the demand for better trees.

The report is of especial interest to nurserymen in that it outlines subjects to be observed or avoided. It is suggested that trees for city streets should possess endurance as to foliage, toughness to withstand high winds, slender, upright habit of growth, elasticity, cleanliness, longevity, a medium leafing period, a natural form suited to certain requirements, moderate shade, recuperative power, small leaves.

Aside from the immense advantage of the work of such a society to a community, it is of direct benefit to the nursery trade. Its high plane creates a demand for the best the nurseryman can produce. The Brooklyn Tree Planting Society, organized in 1882 has attained a national reputation. Its influence has been shown in the organization of similar societies elsewhere.—National Nurseryman.

The Curse of Treelessness.—Any one who has traveled through the comparatively treeless countries around the Mediterranean, such as Spain, Sicily, Greece, northern Africa, and large portions of Italy, must fervently pray that our own country may be preserved from so dismal a fate. It is not the loss of the forests only that is to be dreaded, but the loss of agricultural regions now fertile and populous, which may be desolated by the floods that rush down from bare hills and mountains, bringing with them vast quantities of sand and gravel to be spread over the lowlands. Traveling a few years ago through Tunisie, I came suddenly upon a fine Roman bridge of stone over a wide, bare, dry river-bed. It stood some thirty feet above the bed of the river, and had once served the needs of a

prosperous population. Marveling at the height of the bridge above the ground, I asked the French station-master if the river ever rose to the arches which carried the roadway of the bridge. His answer testified to the flooding capacity of the river and to the strength of the bridge. He said: "I have been here four years, and three times I have seen the river running over the parapets of that bridge." That country was one of the richest granaries of the Roman empire. It now yields a scanty support for a sparse and semi-barbarous population. The whole region round about is treeless. The care of the national forests is a provision for future generations, for the permanence over vast areas of our country of the great industries of agriculture and mining upon which the prosperity of the country ultimately depends. A good forest administration would soon support itself; but it should be organized in the interests of the whole country, no matter what it cost.—C. W. Eliot in *Atlantic*.

CATALPA AND MAPLE TREES.

B. V. J., Suffolk county, N. Y.—Is the Catalpa as desirable for a shade tree as the maple? Does it grow as quickly? Which is the best kind of maple, and most used in this part of the country?

Answer.—The Catalpa will, probably, grow faster than any of the maples. Whether it is as desirable or not for a shade tree, is a matter of taste. Its flowers are borne in conspicuous racemes, while the maples have no conspicuous flowers. The leaves of the Catalpa are so large in well-grown specimens as to give the tree a tropical appearance. We would choose the Hardy Catalpa (*Catalpa speciosa*). Among the maples, we would choose for a shade the Norway, although the Sugar maple is somewhat faster growing. If purple leaves are valued, Schwerdler's or Reitenbach's should be chosen. The young leaves are beautifully tinted.—Rural New Yorker.

TREE PLANTING IN OUR CITIES.

Now that the city seems to have taken up the planting of trees, attention is called to the fact that the protection of those already planted is a subject of fully as much importance as the planting. How many true lovers of trees have had their hearts made sad by the ruthless destruction of some of our beautiful trees and the serious injury of many others. I wish to call your attention to a few of these cases. Only the other day I saw a crowd of telephone men cutting off various branches and tops of trees. And why, forsooth? Because they interfered with their putting up additional wires. These trees were disfigured, distorted out of shape, and injured so that they will have to be either pruned back to an even head or be left unsightly for some years to come. I took occasion to stop them just as I would were I to see a man abusing his team. It hurt me just as much, this damage to trees, as would the other, and I had just the same right to interfere. I wish every one in our city knew of the decision made lately in Bucks Co., Pa., wherein Dr. John Marshall sued the American Telephone Co. for the destruction of fifty trees, and obtained a judgment for \$737.41 and a fine of \$50 each against the men who committed the vandalism.

The city itself is responsible itself for this wanton injury and destruction of our beautiful trees. Another instance is as follows: "While some graders were at work on a street, I saw them cutting down a beautiful maple tree that had been planted twenty-five years, was eighteen inches in diameter and had a spread of branches of over forty feet. This tree was less than one foot above grade, stood inside of the curb, and within enghteen inches of where it would have been planted if planted after the grading had been done. Is it any wonder that true lovers of trees shudder at such sacrilege? That tree was worth \$200 to the property on which it stood."

Another instance. While some graders were taking out the sub-grade from one of our streets where a lot of young elms had just been planted on the newly opened street, they made of their horses walk on the inside of the curb as they were plowing, and as the doubletrees came to each tree, they tore the bark from them, some one foot, some two feet,

and some three feet, and from one to two inches wide. A protest from the owners of these lots and the trees just planted called forth jeers of derision. I know people who would rather the city should kill, or allow to be killed by ordinance, the best horse or cow they owned than to have such trees destroyed.

I call attention to these three cases, not that it can be possible to replace the trees, but that we may learn to take care of what we do plant hereafter, and above all, save every tree that can possibly be saved, if it be anywhere near the place a tree should be. In many of our cities they have saved a beautiful tree a hundred years old, even if it stood in the middle of a street. Let us then guard carefully and faithfully every tree that will be of use to us, and a thing of beauty in the future.

The beautifying of our city in the planting of trees is a matter we should always delight in and help to foster. Not only for the street do I plead, but we should have vacant property, where held in any body, planted in beautiful trees, evergreens and shrubs. It takes years for them to grow, but a man with means can build his house in one year. Lots so beautified will pay the owner dollars for cents expended.

Before leaving this subject which is so near my heart, I should like to give a few thoughts from my own experience here of thirty years in the manner of digging, handling, planting, caring for trees, and the best varieties to plant.

The Trees.—The best trees are those nursery grown. If they have been transplanted once or twice, so much the better. These trees should be dug carefully, so as to get plenty of good fibrous roots, for without good roots one can not get good growth. A tree should have a spread of root of one foot across for every inch of diameter at the crown, that is a tree three inches in diameter should have roots three feet across.

Handling the trees after being dug is sometimes done as if they were a load of poles or rails. Too many forget that the tree is alive, just as much as you or I, and if the roots are exposed to the least frost or permitted to lie in the sun, they are either dead or so badly injured that they will show a very feeble growth or not grow at all. Just as well expect a fish to live out of water as a tree to live out of the ground unless well protected and the roots, body and branches kept moist. More than one-

half the shade trees die because of not being properly handled. Not one tree in fifty should die if properly dug. We never lose more than this in our large orchard planting. We discard every tree that is doubtful. But I think I have seen plantings of street trees where not one in fifty lived.

Planting should be well and carefully done. Dig good large holes, use plenty of good top soil (no manure), put around and among the roots, and above all pack down well so that every root is in contact with good firm soil. A failure to do this often results in a failure to grow or to live during the summer if the tree even starts to grow. Care must be exercised and judgment used in not handling the soil when it is too wet or sticky. It should crumble nicely.

Mulching is a great help in holding the moisture about the tree, and it always pays to use it during the first two years after planting.

Water.—If the ground is in proper condition, no water need be used, but if too dry, then it is best to use one pailful of water when planting. Wrapping or shading the bodies of the street trees for the first year is indispensable. Those long, naked trunks need something to break the force of the July sun in order that the trees may make the proper growth.

Varieties.—Undoubtedly the tree for use is the elm. It is long lived, hardy, and a beauty at all times of the year and at all ages. Next comes the ash leaved maple or box elder. It is more hardy than the soft maple and nearly as rapid a grower. Next in order comes the white ash. It is hardy, medium growth, making a close compact shade. I can not omit the soft maple because of its rapid growth and quick shade. If properly trained it will not break or split except in extreme cases. The linden or bass wood is a good one. The tulip or poplar is a beautiful tree also. Use the catalpa where flowers are wanted. I want also to call attention to the sycamore, because of its resistance to the smoke of our cities. Properly trained it makes a beautiful tree and it will stand more smoke and thrive better than any other tree we have. Not all people understand that the scraggy appearance of our trees and shrubs is due to the coal smoke, and if man were fastened like the trees are, to one position, he would soon die also. It is because he can move that he lives. If we want beautiful trees we must discard the use of soft coal in our

houses, especially so if it be a closely settled locality. But the most beautiful, most hardy, longest lived tree we have is the sugar maple. Where shade is wanted quickly, plant some of the others, but alternate them with the sugar maple, and then cut the others out as soon as they begin to crowd. I enter my most earnest and emphatic plea for the greater planting of the sugar maple, and twenty-five years from now others will bless those who planted. Let us plant for the present, but let us not forget the future.

One other item in this beautifying of our streets. Let us plant on each street all the trees of one variety, so that the beauty of the street may not be marred by bad breaks or gaps along it. Or plant two varieties alternately, as the elm and maple, or the ash and box elder, the sugar maple and catalpa, or the linden or tulip and one of the others, and then cut out as soon as they begin to interfere. Do not allow tree butchers to prune your trees. Pruning they need perhaps, but better call it training. Do not prune them too severely. Use moderation, and do not go to either extreme.

One of the other points that too many lose sight of, is the fact that trees are just as beautiful while they are small as when they are large. Do not try to plant too large trees. A young, thrifty three or four-year-old tree looks much better for years to come than the bare pole so many plant because they have the caliber; and these young trees will make better trees and be fully as large in seven or eight years as are the large unsightly poles seen everywhere.

Love trees while they are growing; love to see them grow; love to care for them, see beauty in every tree, branch, twig and leaf, and you may be sure the trees will repay you for all your care.—L. A. Goodman, Westport, Mo.; *Rural World*.

THE SUNFLOWER'S STORY.

You say I am only a sunflower,
 With petals as yellow as gold;
 But if you will listen a minute
 A bit of a tale I'll unfold.
 'Twas way, way back in the springtime
 That a fairy shut up in a pod
 Burst off her little brown jacket
 And left it down under the sod.
 "I can't be contented," she answered—
 When some one asked her to stay—
 "'Tis so dark and cold 'neath the damp earth mold;
 Above there is shining the day.
 "'Tis only a short transition
 From a bud of promise rare
 To the glorious full-grown blossom
 That revels in sun and air;
 "And soon as many as twenty—
 Of beauties such as I—
 Were turning to catch the sunshine,
 With our faces toward the sky."
 For this was the lesson that she taught us—
 This fairy mother of ours—
 To be always seeking for sunshine
 Despite the clouds and showers.
 And so she pushed upward and upward—
 A thing most easily done
 When our heart is right in the purpose,
 And our soul is wooed by the sun.
 But by and by through her being
 And strange, new impulse thrilled,
 And she paused in happy silence
 While the birds 'mong her branches trilled.
 Then murmured in blissful accents:
 "I'm promised bud and bloom;
 'Tis well I made the effort
 Else the pod had been my tomb."

—*Velma Caldwell Melville, in How to Grow Flowers.*

THE MOCK ORANGE.

In the beginning of June—sometimes the latter part of May—and
 for nearly two weeks afterward, one of the most attractive flowering
 shrubs is the mock orange. It has a profusion of large, pure white
 flowers, the fragrance of which resembles that of the orange blossoms;

hence the common name. Botanically it is known as "Philadelphus," the species most commonly grown being "P. coronarius." Formerly the term "Syringa" was sometimes applied to this shrub, but is now wholly confined to the lilacs.

The flowers are always produced on the last year's wood, and pruning is best deferred until the bloom is over. Judicious pruning is necessary in order to maintain good form, as the little trees are inclined to be irregular.

Cuttings made in the fall, or early in spring, take root readily and in a few years attain flowering size.

Another species, Gordon's "P. Gordonianus," blooms in July, and on this account is desirable, but its flowers lack fragrance.—National Stockman and Farmer.

BEES.

WINTERING BEES IN MISSOURI.

Editor "Rural World:" A certain writer on bee culture of this state claims that bees will not freeze in the latitude of Missouri, provided they have plenty of stores in reach above the cluster. Now, I live in northwest Missouri, and do not wish to bump up against some one superior to myself, but I must say that taking it one year after another I do not believe the above is absolutely correct. I base my opinion of such on my experience and the experience of others.

I believe that in my locality there are only two methods of wintering bees successfully. The first method is accomplished by using the double walled chaff hive or by having outside winter cases, large enough to slip over the single-walled hives, and leave room for packing. The second method is reached by placing the bees in an underground repository. Remember, I say underground repository, not an out of ground repository.

I once knew a farmer beekeeper who built a bee-house that was air tight. However, he only used it one year, for the simple reason that he placed all the bees in the house and as a natural consequence, they smothered. This same man has bought more bees and spent more money on them than any person I know, and yet can't supply his own family in honey the year round. But, returning to the subject, I make this explanatory assertion: I know there are winters when bees will do all right if left alone. Yet, if the beekeeper wishes to be on the safe side, and make beekeeping a success, it is well for him to follow one of the above methods either in part or in full.

Whatever method the skillful apiarist may choose, he must bear in mind that there are four principal essentials to successful wintering. They are as follows: First, a sufficient amount of wholesome food above the cluster; second, there should be a strong force of young bees; third, proper temperature; fourth, ventilation.

Columns might be written on the above conditions, but I will just say that thirty-five or forty pounds are what a strong colony requires to keep it over till the next honey flow, while a weak one requires much less. More honey is consumed during the brood rearing the spring than in the winter. Five or ten pounds would carry them through the winter till spring.

The bees that are reared in the fall are the ones that live through the winter and build up the colony in the spring. Temperature has as much to do with the amount of honey consumed as well as their vitality. Most apiarists that winter their bees in cellars try to maintain an average temperature of fifty-two degrees.

With regard to ventilation, beekeepers are not universally agreed. Some believe in top ventilation, while others believe in bottom ventilation. All agree, however, that plenty of ventilation is necessary. All preparation for wintering should be finished by the last of November.—Ambrose L. Riley, Andrew Co., Mo.

KEEPING HONEY.

The driest and warmest place in the house should be chosen for storing sections of comb honey in, says the "British Bee Journal." A kitchen cupboard close to the fire forms an ideal storing place, and if the sections are protected from dust, insects, mice, etc., by careful wrapping, the honey in them will keep liquid for over twelve months. In some seasons, however, honey in sections will granulate in spite of every care. Personally we have many times had sections in the best of condition after twelve or eighteen months' storing.—Colman's Rural World.

WHOLESOME HONEY.

Physicians say that honey is more wholesome than sugar, as it has no injurious effects upon either stomach or kidneys and is more rapidly assimilated into the system. They also say that it would be well to substitute it for butter, particularly for children, and this would be economy as well, for the pound of honey would go as far as the pound of butter, and afford more actual nourishment to the body. We say go as far, because if children are given all they care to eat of it with their bread at each meal, they will not eat as much of it as one might expect them to who saw them indulge when it was given them only at long intervals and as a luxury. Under these conditions, most of children and many older people would eat as much at the one meal as they would at three meals, if it was always before them.

The pound of extracted honey costs much less than the pound of comb honey, and there is neither bother nor waste, as with the comb honey. One can buy it at the grocers in sealed tin cans direct from the apiary, and be very confident of obtaining pure honey without adulteration with sugar, syrup or glucose, if there is no beekeeper near by to furnish it. With the small glass jars or bottles in which it is sometimes sold we have less confidence in its purity, as by using fifty or even twenty-five per cent of a dark-colored and strong-flavored honey, the very cheapest sort, the glucose or syrup can be given an odor and flavor very like the

genuine article, and yet not the same. An expert quickly would detect the adulteration.

A bit of broken comb to be seen through the glass is no proof of pure honey; in fact, it is rather more likely to indicate that it is not pure, as the careful beekeeper who extracts his honey will be likely to strain it, and no comb will be found in his product. The presence of sugar, or granulated honey, as it really is, many think indicates the presence of sugar in it, or that the bees have been sugar fed, but it is probably an indication of purity, and keeping under proper conditions for all honey will granulate in a dry, warm place. As regards keeping we copy from a recent bulletin:

“The average housekeeper will not put honey in the cellar for safe-keeping—the worst place possible. Honey readily extracts moisture, and in the cellars extracted honey will become thin, and in time may sour: and with the comb honey the case is still worse, for the appearance as well as the quality is changed. The beautiful white surface becomes watery and darkened, drops of water ooze through the cappings, and weep over the surface. Instead of keeping honey in a place moist and cool, keep it dry and warm, even hot. It will not hurt to be in a temperature of even hundred degrees, and where salt will keep dry is a good place for honey.”

WINTERING BEES.

A German apiarian says that bees can be successfully wintered on sugar, but they will not do as well the next season as they would if wintered on good honey, which is the most natural and best food for bees. We do not know how many experiments he has made to prove this statement, but we should require many tests to convince us that this was invariably true. It may be so, but we think if they have enough of either honey or sugar under the same conditions, there will be but little difference in their working ability in the spring.

Mr. Doolittle in *Bee Gleanings* says if he was working to produce extracted honey only he would select the darker Italian, or those produced from queens from an imported mother, and taking no care as to whether the drones were from Italian, black or hybrid stock. If he wanted comb

honey only he would have a good queen of the golden variety, and would not care whether they mated with black or hybrid stock, as his experience has shown that such crossbred workers have proved the very best for comb honey. The drones should be only distantly related to the queens. Use queens closely related to Italian stock for extracted honey, but when white-capped comb honey is wanted choose the golden Italian queens, and the hybrids from them are in no way inferior to Italians from imported stock in honey-gathering qualities.—Am. Cultivator.

A PLEA FOR BIRDS.

Who does not appreciate the songs of the birds, especially on an early spring morning when all nature is awakening from its long sleep? How joyfully we greet the first robin, and later, when warm weather comes how pleasant it is to go into the woods and groves and listen to the music that gushes forth from the throats of many happy songsters, and see them flit about in the sober hues of the robin, or the brilliant coloring of the oriole, and yet a great many people do not think the birds useful to us, and cruelly and heartlessly kill them.

Besides the pleasures derived from their songs and beautiful plumage they are, as a class, very useful to man. Take the robin, for example. Many people kill the robin whenever they get a chance, on the plea that he eats their fruit. He does eat fruit, but still he kills many noxious insects, and I heard a gentleman say that he would share a cherry with a robin, for anybody is selfish who will not give him a little fruit for his work of saving it all.

The brown thrush and cat bird also eat fruit but the bugs and worms which they catch pay for their fruit.

Swallows, martins, blue birds and wrens are almost entirely insectivorous and are of untold benefit to the farmer.

Almost anybody is ready to kill a hawk or an owl whenever he sees one, on account of his liking for domestic fowls. These birds eat very few fowls compared with the number of injurious insects which they eat. They also catch many field mice that otherwise would be the means of destroying much grain.

The woodpecker is said by some to spoil apples and to make holes in fruit trees for the purpose of getting to the tender wood beneath. Only one species do this, but all woodpeckers dig out insects, which, if they remained, in time would kill the tree, being beneath the bark so that only certain birds can reach them. The bee martin is thought by some to eat bees, but upon examining the crops of a number of these not one bee was found.

In Prussia a few years ago there was a bounty given for killing birds. Many were killed, and, as a result, at the end of two years the crops were utterly destroyed by insects. After all the benefits the birds are to us to think of so many being killed annually as there are is enough to make one shudder. Many are killed for sport, while others are used for food or to adorn ladies' hats and dresses. It is a most cruel and heartless custom for women to wear birds, by whose death our land is being gradually thinned of its beautiful songsters, who are our best friends. One should be kind to the birds, instead of being the cause of their death for the sake of vanity.—Grace Cade, in Homestead.

TO PROTECT THE BIRDS.

A. H. GILKESON, SR., INTRODUCES A NOVEL SCHEME INTO THE SCHOOLS.

A. H. Gilkeson, Sr., of this city is an enthusiastic and valuable member of the State Horticultural Society. He was present at the last meeting of the society when a strong resolution was placed favoring the protection of the birds.

In conversation with a "Star" reporter this morning Mr. Gilkeson spoke of the value of the birds especially in fruit raising. For illustration he said that several years ago he presented to the students of the Normal and Public Schools some fine apples, small in size but of a rare variety. The apples that year were excellent in quality but this year they are very poor on account of a kind of worm. Had there been sufficient number of birds to have destroyed the insect the fruit would have been perfect again.

Mr. Gilkeson has broached the subject to Pres. Howe of the Normal and before school is dismissed for the holidays the subject will be presented to the Normal students. The latter will be asked to visit some school and attempt to interest the children in the protection of the birds. If the children can be taught the value of the bird there will be no trouble about the preservation of them.

The matter will be further carried out by being introduced into our city schools in the near future. The scheme is one worthy of encouragement from all points of view and it is to be hoped that it will become a part of our educational system. Longfellow has fitly expressed their use in the stanza, beginning:

"You call them thieves and pillagers, but know,
They are the winged warders of your farms."

—Warrensburg Standard.

IMPROVED CHESTNUT CULTURE.

IS THERE ANY PROFIT IN IT?

What is the present outlook for growing improved varieties of chestnuts? Is it practicable to graft large forest trees to improved varieties?

So far as our observations have extended, we do not note any increased interest in improved chestnut culture this season. We are slow in advising the clearing of timber land and grafting sprouts, especially if there is any chestnut timber near. There will be too many wormy nuts. This is one of the most serious drawbacks, and unless some way of getting ahead of the weevils is discovered, I doubt if the industry can be made to pay. In orchards away from the native chestnut, the weevils are not so plentiful. The trouble here is that it requires time and money to get an orchard into profitable fruiting. On the whole, we must say we are not so sanguine as we once were. We find, too, that the season for the sale of chestnuts is much shorter than that of other nuts, on account of the difficulty of keeping them in prime condition. Perhaps if this were better understood, their season of sale could be lengthened.

You do not say how large your trees are. If they are scattered over the place, and not over six or eight inches in diameter, the best way would be to cut off all the branches, where they are from one to one and

one-half inch thick, and graft each over. This requires considerable time, but one could get large bearing trees in a year or two. If it is on a piece of timber land it would have to be cleared, and the sprouts grafted. We would not advise grafting sprouts, unless they are on land that is comparatively level, and free from rocks. The labor of mowing the underbrush, and gathering the nuts is too great on rough land. That is our experience, whatever others have discovered. E. M. Engle & Son.

There is, undoubtedly, a rapidly increasing interest in chestnut culture, and it is going to increase until there are a great number of extensive orchards in the country, and until thousands of bushels of nuts are marketed yearly. Grafting on small stocks about the same size as the scion, and doing the work close to the ground, seems to be best. Still, by cutting back older trees, and getting new vigorous shoots, there is no reason why chestnut trees can not be top-worked, the same as the old apple tree. My son climbed to the top of a big chestnut two years ago, and put in a single scion with the cleft graft, and last fall he brought into the office quite triumphantly a handsome lot of burrs that came from that scion, which clearly proves that the thing can be done all right.—J. H. Hale, "Rural New Yorker."

Give fools their gold, and knaves their power,
Let fortune's bubbles rise and fall,
Who plows a field or trains a flower,
Or plants a tree is more than all;
For he who blesses, most is blest,
And God and man will own his worth
Who seeks to leave as his bequest,
An added beauty to the earth.

FORESTRY.

THE YOSEMITE PARK.

Acting Superintendent Wilcox, of the Yosemite National Park, in his annual report, recommends that the government buy out the owners of patented lands within the park limits to remove one great source of trouble and destruction.

Other recommendations are the fixing of penalties for violation of the park regulations; obtaining authority from the state of California to establish a camp for troops within the Yosemite Valley for patrol purposes, a permanent camp to be constructed at Wawona; a systematic burning of fallen and dead timber, to prevent forest fires; and some decisive action to prevent diverting the waters flowing into the park. The report says the deer within this government reserve are fairly plentiful and tame; bear, quail, squirrels and trout are numerous, and mountain lions and lynx are in evidence.

THE PROPOSED NATIONAL PARK OF THE SOUTH.

Little by little the feeling for forest preservation is gaining ground. It is the south now.

The work in behalf of forestry preservation that has been undertaken in the west and the north has given rise to the idea of a similar movement in the south, where the work of denuding the forests is in such rapid progress as to threaten their utter destruction in a short time unless something is done to stop it. The despoiling of the trees would make the land comparatively valueless.

Congress, when it meets next week, will be asked to look with favor upon the request of the people of the south for the establishment of a national park in the southern Alleghenies, probably in the Blue Ridge

or some portion of western north Carolina. There is no national park except military parks in the south. All that will be asked of congress at present is the appointment of a commission to examine into the propriety and feasibility of preserving the forest regions near the border.—American Gardening.

CULTIVATION.

"WHEN THE GREEN GITS BACK IN THE TREES."

In the spring, when the green gits back in the trees,
 And the sun comes out and stays,
 And your boots pull on with a good, tight squeeze,
 And you think of your barefoot days;
 When you ort to work and you want to not,
 And you and yer wife agrees
 It's time to spade up the garden lot—
 When the green gits back in the trees—
 Well, work is the least of my ideas
 When the green, you know, gits back in the trees.

When the green gits back in the trees, and bees
 Is a-buzzin' aroun' again,
 In that kind a lazy "go-as-you-please"
 Old gait they hum roun' in;
 When the ground's all bald where the hayrick stood,
 And the crick's riz, and the breeze
 Coaxes the bloom in the old dogwood,
 And the green gits back in the trees—
 I like, as I say, in sich scenes as these,
 The time when the green gits back in the trees,

When the whole tail-feathers o' winter time
 Is pulled out and gone,
 And the sap it thaws and begins to climb,
 And the sweat it starts out on
 A feller's forrerd, a-gittin' down
 At the old spring on his knees—
 I kind o' like, jus' a-loaferin' roun'
 When the green gits back in the trees—
 Jes' a-potterin' roun' as I—do—please—
 When the green, you know, gits back in the trees.

—James Whitcomb Riley.

THE NURSERY CONVENTION.

PROTECTING NURSERY STOCK.

"What is the most practical kind of hedge for farm purposes, and what for parks and cemeteries?"—was a question which drew out some discussion, some favoring the osage orange for farm purposes; but Mr. Albaugh sat down on the whole matter by stating that after an extended experience with some four miles of osage hedge, he had come to the conclusion that the only practical farm hedge is a barbed-wire fence.

The question, "Is it desirable to form a national combination of capital in the nursery business?" was one that rather staggered the members of the convention. One gentleman, who confessed to having an eye on the secretary-treasurership, though it might be desirable, but ventured no further suggestions.

Prof. E. S. Goff, of the State University, Madison, Wis., read a paper on "Root-Killing of Nursery Trees." The speaker referred to the damage that had been done during the past winter in the northwest, where, over a tract covering several thousand square miles, one, two and three-year-old fruit trees were more or less root-killed, and proceeded to draw lessons therefrom. He said, in part:

"The wide-spread destruction of roots brings home very forcibly a fact that has been too often overlooked—that in the breeding of hardy fruit trees, we have two distinct problems in hand, i. e., to produce a hardy top and a hardy root to support it. Neither is safe without the other. We have been trusting to nature to protect the roots by snow, but the past winter is a most effectual reminder that this protection is not to be depended on. The roots of the crab-apple are hardier than those of the common apple. Had apple stocks been generally grown on crab seedlings instead of common apple seedlings, the damage from root killing would probably have been greatly reduced. In like manner, we should experiment with the sand cherry and the wild red cherry as stocks for the cherry, and we should confine the plum to Americana stocks. All means should be used to cause snow to remain on the ground of the nursery during the winter. If half of the snow that actually fell up to February the past winter in southern Wisconsin could have been retained,

it would probably have been enough to save our nurseries. Planting fruit stocks on north slopes that are traversed east and west by frequent evergreen windbreaks, would go far toward accomplishing this end. A cover crop on the ground would still further encourage the snow to remain. The superior hardiness of the raspberry as compared with the blackberry has been strikingly brought out in a multitude of cases. Many have reported almost total destruction of the blackberry, while the raspberry was comparatively little injured. The Loudon raspberry among reds and the Older among blacks have established their claims for remarkable hardiness.

Should root-injured trees be sold? This is a practical question, and one which seems to admit of an easy answer. The injury generally proceeds from the tips of the roots backward. If only the fibrous roots are killed, the trees may be transplanted with as much safety as if no injury had occurred, for the fibrous roots are mostly sacrificed in transplanting by our present systems. I do not know that it is much worse to have the smaller roots frozen off, than to have them cut off with the spade or digging machine.—Country Gentleman's Report of Nurserymen's Convention.

A paper was read by C. L. Watrous, Des Moines, Ia., on "Injury to Nursery Stock Last Winter, and How it Happened," in which he combated the commonly accepted explanation of severe dry freezing in February. Mr. Watrous had consulted the records of the U. S. Weather Bureau, from which he ascertained that the weather for November, 1898, had been drier than usual up to November 21st, at which time there was an unusual precipitation of rain, turning later to sleet and snow. The explanation advanced by Mr. Watrous of the injury sustained is that the lack of rain and frost in November before the 21st left the foliage upon trees and plants of all kinds so that their roots were thirsty. The drenching rain of the 21st enabled them to gorge their cells with water. The soil to the average depth of 8 to 10 inches was thoroughly watersoaked also, and was suddenly frozen in that condition. The greatest damage to the roots was done to the plastic part between the wood and the bark, known as the cambium layer, where the cells are large and full of life.

They filled themselves completely, and when the sudden freeze came. their walls were ruptured as the shell of eggs are under similar circumstances. Some cherry trees on Mazzard stocks were examined early in April, and the roots were found black, as if they had been dead a long time. They were not dry, but wet, and the soil about them was wet.

THE NURSERYMAN AND THE ENTOMOLOGIST.

With the removal of the native forests and the introduction of cultivated trees, the equilibrium of nature was disturbed and new problems set for the horticulturist, so that the offices of the economic entomologist were soon required. Entomology has endeavored to keep pace with horticulture. From the widely diversified labors of the single person appointed by the commissioner of patents in 1854 to collect statistics and other information on seeds, fruits and insects for the Bureau of Agriculture, the national entomological work has grown until it requires the undivided time and attention of an entomologist, four assistants, three investigators with five assistants, and an artist, all working under the division of entomology of the United States Department of Agriculture. Nearly every state and county horticultural society in the United States has an entomologist as one of its staff officers.

It is not infrequently supposed that insects as a class are injurious. Many indeed are ignorant of the fact that insects fill a vast important part in the economy of nature. In his endeavors to reduce the numbers of an injurious insect, the nurseryman has valuable co-workers of two kinds within the insect tribe. First may be named the parasites which lay their eggs upon the eggs or developing forms of injurious insects, the eggs of the parasites hatching and devouring the pernicious forms. Citations of the sudden disappearance of the maple worm and the army worm as the practical result of the labors of parasitic insects might easily be given.

The horticulturist in reality, however, pays a good price for the beneficial work done by these parasites. Before he can realize any benefits from these parasitic insects, he must have sustained a loss somewhat proportionate to the valuable work subsequently done by them. The

case is somewhat different with the predaceous insects—those that devour other forms as they are being developed. Their benefits are more direct. They attack the enemy while it is engaged in active hostilities. The most noted case—one as yet without parallel in the co-operation of predaceous insects working with the fruit growers in destroying the injurious forms—is the vedalia lady-bird beetle (*Novius cardinalis*). This important lady bird beetle, by its rapid multiplication and voracious appetite, has completely removed the destructive scale in the orange groves of California, and saved millions of dollars to the state. It was sent to South Africa, where it did equally good work upon the fluted scales of that country, and later in Egypt and Portugal did good service.

Alongside of the destroyers of injurious forms can be placed as friends of the horticulturist those insects which bring about the proper fertilization of the fruit tree and vegetable blossom. Chief among these pollenizers may be considered the honey bee. In the future, fruit growers are likely to be generally regarded as more indebted to beekeepers than the latter are to the fruit growers, for the amount of honey the bees secure from fruit blossoms comes far short of equaling in value that part of the fruit crop which many accurate observations and experiments indicate is due to the complete cross-fertilization of the blossoms by bees. While this warefare has been going on in the United States, we have been advancing, until we are producing more and better fruits than any other country in the world.—Prof. S. J. Hunter, University of Kansas, before Nurserymen's Convention.

FRUIT BUDS.

Prof. W. R. Lazenby, of Columbus, O., presented a paper on "The Origin and Development of Buds on Fruit Trees." Fruit buds are of three kinds—(1) leaf buds from which new shoots are developed; (2) flower-buds, which consist of undeveloped flowers, and (3) mixed buds from which both shoots and flowers may come. It will be seen that leaf buds are concerned in the growth of the plant on which they are borne, while flower buds result in the development of new individuals. Fruit buds may be divided into two groups—(1) buds formed the same year

they open, and (2) those developed the previous year. They may be either lateral or terminal, the lateral buds being most common on peach and nectarine, while those of the apple, pear and plum are usually terminal.

The flower buds toward the end of the branches of peach trees seldom develop. All of the buds at a node on peach trees may be flower buds, but when three are present the center one is a leaf bud. Although the flower buds do not as a rule open until a year after they form, in some instances they open in the fall of the same year, and during warm periods in the winter they enlarge so as to be one-eighth of an inch long by February 1. Many varieties produce about the same number of buds, and there seems to be a definite relation between the number of the two kinds of buds, the leaf buds usually constituting from 35 to 46 per cent of all the buds on a tree.

During the growing season there is little difference between the flower and leaf buds of the apple. As a rule, those on the new shoots are leaf buds, while the fruit buds are in short fruit spurs. The leaf buds of plums are generally smaller and more pointed, and the flower buds are in spurs. As a rule, the leaf buds are closely appressed, while the oval flower buds stand out from the branches. On some sorts the buds are in threes at the base of the shoots and are solitary towards the tips. In the pear there are six to nine flowers in a bud, and there is little difference between fruit and flower buds. The form of the leaf buds in different varieties is more constant than is the form of the fruit, and one familiar with their appearance can rely upon the buds to determine the varieties. Cherry trees develop their buds one year and open them the next. They are usually three to eight in a fruit spur, with a leaf bud at the tip. Grape buds are borne on wood of the same year's growth and are on the first few nodes opposite leaves. When a tendril occurs opposite a leaf, no fruit buds will be found further along on the cane. Leaf buds may be changed to flower buds and flower buds to leaf buds at any period of their growth. The development of flower buds can often be brought about by summer pruning and other operations that check the growth of the trees.—Country Gentleman's report of Am. Pom. Society.

HOW ROCK BECOMES SOIL.

The "hardheads" at Hope Farm, presumably break down eventually to supply potash and other elements to the plants living near the dying rocks. Those of us who have been reared on the glacial drift know that stony farms are fertile, though not always popular. Where one can observe plants growing on rock-bottom it is learned that soil is being formed—trees are the vigorous sappers and miners of the plant kingdom. Their roots push along rock fissures, and by their insistent growing, make the opening yet wider. Where trees were growing close to the edge of a little precipice made by a joint plane in the shale rock at Ithaca, N. Y., roots were observed along the seams, having apparently come through six feet of solid rock from the trees of which they are a part.

It is plain that these trees get roothold below the surface soil, and it is likely that they draw food and moisture from the rock, which is for them a substantial hardpan subsoil. In moist climates a very thin layer of detritus is sufficient to serve as soil. I have noticed a little patch of moss and grasses growing upon the flat outcropping of the shale. Upon stripping it up—it made resistance—it was seen to be a felted turf an inch in thickness. The under surface was white with fine roots, blind fingers groping for crannies in the rock and finding every one. The place on the rock was seen to be a little depressed and quite damp. Perhaps the depression gave the first-comers their chance, but the colony in possession had widened and deepened the place, for several fragments of the shale were found to have been fetched away, when the turf was lifted. The roots had pried these off with the help of frost, heat and moisture, then grown around them. Even this thin soil is growing; the old adage is reversed. The moss gathers the rock.—Howard B. Cannon.

LIQUID AIR FOR REFRIGERATOR SERVICE.

The Fay Fruit Company, of Los Angeles, has made arrangements with Charles E. Tripler to use his process and appliances for the manufacture and employment of liquid air. The particular end in view is to equip the refrigerator cars of the company so that liquid air can take the place of ice. Since the company ships east yearly over 2,000 car loads of citrus fruit, vegetables, dried fruits and nuts, and the great bulk of its shipments must be made in refrigerated cars, this one phase of the matter is highly important. The plant which will be installed for liquefying air will also supply magic substance for use in every other conceivable way. F. B. Fay and his associates of the Fay Fruit Company are believed to have "got in on the ground floor" of a very important enterprise whose consequences will be far-reaching.

Mr. Tripler has broken a record and demonstrated the possibility of using liquid air for refrigerating cars in which perishable goods are shipped by sending liquid air from New York to Chicago—a distance of 1,000 miles. Liquid air can be made nowadays at an expense of from ten to twenty cents a gallon. A three-gallon receptacle in an ordinary cold-storage room will last a week and do the work of a ton of ice, the air costing, however, not more than 60 cents.

Mr. Tripler's devices make it possible to regulate the temperature produced by liquid air. The inside of the refrigerator cars equipped with his appliances can be kept automatically at an equable temperature. It will probably be necessary to fill the liquid air reservoirs at two or three points on the journey across the continent, just as it is necessary to fill the ice tanks under the present system, so this will necessitate the construction of factories at some such points as Las Vegas and Kansas City.

The superiority of liquid air refrigeration is based on many reasons. For one thing, it will reduce greatly freight on fruits. Five tons are now necessary for each car. This occupies about one-sixth of the car space. The liquid air refrigerating apparatus will, it is said, take up very little room, and weigh but a trifle in comparison, although 50 gallons are used at a time. Consequently each car can carry much more fruit than

heretofore, and the waste of hauling a sixth-carload of mere cooling material will be obviated.

Ice refrigeration means the filling of the car with moisture. Liquid air melts into perfectly dry atmosphere. It produces the same circulation of air that takes place in an ice-refrigerated car, but instead of vapor dry air will henceforth circulate.—Los Angeles Times.

COLD STORAGE.

1. Cold storage, if properly conducted, is practicable and profitable for the fruit grower.

2. Where fruit is grown for home use, or the local market, home cold storage is advisable.

3. City cold storage is preferable for large quantities of fruit that are to be placed on the open market.

4. For small fruits, grapes, plums, peaches, in fact, all juicy summer fruits, cold storage is applicable only in holding them for a few days or weeks to carry them over a glut in the market.

5. Pears and apples may be safely held in cold storage for several months if properly treated.

6. For good results in keeping fruit of any kind, it must be rather under ripe, and perfectly sound when placed in storage.

7. The utmost care is essential in picking, packing and shipping, in order that the fruit may arrive at the warehouse in sound condition.

8. Cold storage demands fruit of the highest quality and necessitates especial care in the selection of stock and in the treatment of the orchard. Pruning, thinning and spraying are essential processes.—Conclusions of Kansas State Agr. College.

ORNAMENTING SCHOOL GROUNDS.

SOME CLIPPINGS FROM THE BANQUET AT SHAW'S GARDEN.

By Prof. J. C. Whitten, of the State University.

Fellow Horticulturists and Gentlemen:

It is with a good deal of pleasure that I am permitted to mingle with you this evening to partake of these good things which have been given to us, and to listen to the speakers who have preceded me, who have said many things that are instructive and beneficial to us. In considering this matter of the ornamentation of local school grounds and local church grounds, as has been suggested, it seems to me that there is ample room for all that I may say. I suppose it is not necessary for me to present to the minds of any of you here present interested as you are in horticulture, the great desirability of making the grounds of our local schools and churches more attractive. They should be made places of attractiveness to the younger as well as to the older people, whose lives are more or less interlocked with the associations that cluster around these old school houses and these old churches, which we see scattered about, not only over the state of Missouri, but over all the states as far as I know. Nearly every one of them is devoid, almost, of beauty. I do not think, as I say, that it is necessary for me to present any arguments to show the desirability of that thing, but a few thoughts have come to my mind with regard to the best method of accomplishing that work. One of the things that appeals to me almost irresistibly is this: that the very work of Henry Shaw, whose memory we revere, has furnished us with one of the most admirable examples from which to obtain a knowledge of just how to do these things, and I refer to the garden itself. I suppose a great many of you visit the garden and see the magnificent plants, and the vines trained over rocks and particularly the arboretum and the library, and you see the improvements there, and, perhaps, the whole thing impresses you as being a spontaneous and true example for rural school, and rural church buildings. And having, as the chairman has said, had some personal experience of the life there, and study of the work there at that garden, I can speak somewhat from experience, when I say that that of all the places I know it is the best place from which

we can get even a suggestion for so small a matter as a wooden country school house. While you have magnificent plantings on a large scale, if you go to the details of these plantings you will find examples of plantings where a little rustic summer-house, perhaps, has been so mantled with our own native vines and so shaded with our own native trees that grow in the woods about all these rural churches and school houses, that you will see they can be easily duplicated from our fields and orchards. You will find by looking over these grounds, and by taking up these details that we can get almost any example that we want for the beautification of rural buildings of that sort. It seems to me that instead of the bareness of taste surrounding them, if they take advantage of what nature has so bountifully provided in our fields and woods that grow so successfully here, the farmers have the amplest means of assembling native plants and trees which can be placed in the borders and in the rear of his premises so that they would not only give shade but would materially add to the beauty and comfort of his home. The Virginia creeper mantling the gateways, Wisteria covering the porches, or ivy draping the doorways of dwellings, school houses and churches, would lend a coziness to all those places that would be of immense value to the boys and girls who get so much of their life training there. That life training means so much to us that I can not help saying this evening that the strongest influences of our lives almost comes from these places where we got our training. While I dislike to dwell on and particularize these things, I can not refrain from saying that the very examples found there and the arrangement of the garden, and all that, may furnish to rural communities the things that they need to make an arboretum for themselves, by gathering together the wild flowers and plants that grow all over the state. The same work that is required to gather them up and plant them, may enable the farmer to acquire much knowledge concerning the plants and flowers and shade trees that beautify his place, and a householder could not be better employed than in doing just that thing. It will make those who do it more observant and careful in their arrangement of the growing things in the fields and woods, and on their farms. With the knowledge gained by coming in contact with these growing things, they gradually obtain a better and better acquaintance with them, and, consequently, learn how best to surround their farms

and buildings with them and to ornament their whole environment. Such efforts bring forth the best results. And I want to say further, that I believe that examples of that kind will result in better agricultural methods in the state, and it seems to me no more laudable thought could be brought into the meeting this evening than the discussion of the question of how to plant your grounds to make them more beautiful. I will not intrude upon your patience any longer. I thank you for this opportunity of being here to meet with you. (Applause.)

Toastmaster Trelease: One of the brightest books on rural life that it has ever been my privilege to read, and one that gives all the surroundings of country life, without having any blanks, was published a little over a year ago by one of our Missouri citizens. Its author has been induced to come here this evening, and he may possibly have come under the impression that he would not be called on to speak. If so he is sadly mistaken. I am sure that everyone here will take great pleasure in listening to what the gentleman I refer to has to say on the subject under discussion. I take pleasure in calling on Mr. James Newton Baskett, of Mexico, Mo. (Applause.)

Mr. Baskett, replying in part: Mr. Toastmaster and gentlemen: It seems to me that I ought to devote myself for a few minutes to my friend who has called me up (laughter) for the position he has put me in, for he gave me no intimation whatever of the character of the discussion that is going on. I will forego that and launch at once into the thought which has been so prettily put before you by Professor Whitten, and see what I can do with it from my standpoint. I want to say that I am thoroughly in sympathy with the thought which has been put forth by our toastmaster and so ably discussed by Professor Whitten that there should be in some form instilled into the minds of our country people deeper aesthetic appreciation of the means of ornamenting their homes, their school houses and their churches directly out of the things that are around them. It has been a part of the study of my life to try to impress upon rural folk, and especially upon the farmer, it has been a part of my writing and the talking I have done to impress upon the people

an appreciation of the things that are under their eyes and familiar to them in their daily walks.

I believe it is a misfortune that these things are too common. It is a misfortune that they see them, and the only fact that they seem to learn when they see a vine is that it does not poison them when it has five leaves, but it does poison them when it has three. They look at it from that standpoint. They look at these things from a utilitarian standpoint.

I stand before you to-night utterly discouraged as to finding out any method whatever of impressing upon these people with their environment, the beauty of the things around them.

I stand here self-confessed that whilst I was in the midst of these things they did not impress me. In some way I had another standpoint from which I viewed them, from that which I viewed them under other conditions.

To appreciate them properly I had to be deprived of them and I had to get a sort of scientific interest in them. Therefore, I would say that it ought to be ground into them for years and impressed upon their minds while they are in an impressionable condition. I am not a teacher. I have a few pupils in the country, though I have never taught a day in my life. In the country when one of the boys follows me around I stoop sometimes and call his attention to something that he has cut off or pulled up or mowed down. I find in a great many of the details that he knows more about it than I do, but I find many little things to talk to him about that he has never thought of. I claim that some of these things might be taught in our public schools. I may say that a boy ought to be taught in the public schools how to make a good graft and how to arrange any kind of shrubbery, and I think it will do him more good, for instance, than to know the ramifications of the Connecticut river. (Laughter.)

Do you know away back east when they did not know that there were any other rivers out west, they had on their maps in the geographies the elaborate ramifications of the Connecticut river. (Renewed laughter.) I know as a boy that I got terribly tangled up over that river, but I found out after awhile that there were two or three other rivers in this country besides that one. (More laughter).

Some time since a young lady with whom I am acquainted invited me to call at her house to see some drawings she had made, as she was going to teach drawing lessons. When I called she showed me what she called her best work arranged downstairs. She had her china and best work there. When I had viewed those she told me she had some sketches upstairs that she did not put on exhibition. She produced them and I looked them over and found sketches of leaves and flowers, beautifully, beautifully done, with the very large and deep perspective, which showed that she had learned the art of seeing. My friend, Prof. Woodward, said a while ago he would like very much for me to go out in the woods with him some fine morning and take a look at the things in sight. Dr. Hamilton W. Mabrie said to me: "If you can come around some day, send me word and give me the treat of a day in the woods with you." Prof. Trelease said: "I wish you would go with me to the St. Francis region and study botany." I went out with Prof. S. M. Tracy, on his invitation that if I would go botanizing with him he would go bird hunting with me. When we went out I was looking up for the birds and did not see much of Tracy, while he was digging in the ground and didn't see much of me (laughter), and we were both disappointed, and it was only when we got home and Mrs. Tracy brought out some good refreshments that we came together at all on that day. (Renewed laughter.)

I tell you, you are not going to teach this generation to run vines over their churches and porches and gate posts, about their homes. You may train the children so that in the course of a generation hence they may do that. The ultimate condition of success lies in your training the boy from the beginning until you create in his heart an enthusiasm and interest which will gradually cause him to see it from a practical standpoint of nature culture. You must begin in the public school and in the home. I heartily thank you for your attention. (Applause.)

Toastmaster Trelease next called upon Prof. W. J. Stevens, whom he said was not present at the banquet last year, but who was familiar with the subject under discussion and the author of an interesting pamphlet in this direction.

Mr. Stevens said: Mr. Chairman, members of the board of direc-

tors and fellow-guests at the annual Shaw banquet: The first and most important requisite for the improvement of the school grounds in any community is the presence in that community of at least one person, either the teacher or a patron of the school, who is really interested in the improvement of the grounds. Until there is a desire for more artistic grounds existing in the minds of those who are directly interested and who must make the improvements, it is useless for others to plan or attempt to execute such improvements. If, on the other hand, there is a single determined individual in the community who is thoroughly familiar with the principles of landscape gardening as applied to small yards, such an individual may be the means of transforming the bare, harsh, cheerless, immodest school grounds into a picture which will give pleasure to the pupils and to every passer-by. Such an individual should have good ideals and should be able to give good reasons for the correctness of these ideals. He should go to work systematically as would the inventor or propagator of a new variety of plant. He should have clearly in mind the end to be accomplished, and avail himself of every favorable opportunity to convey his ideals to others whose influence and assistance he must have. Talks with the men, women and children of the community, which shall set forth clearly and without ostentation, the fundamental principles in the beautiful arrangement of trees and shrubbery in yards, will result in the growth of a sentiment in favor of better surroundings for the schools. If, in addition to this, there is offered any opportunity of implanting these ideals in the minds of the people, at public meetings, or if the attention of the women's clubs can be drawn to the subject, the desired result will be more rapidly gained.

If the teacher can be interested to the extent of believing that better surroundings are desirable and possible, systematic instruction may be given in the schools. Here, as elsewhere, the first requisite for proper instruction is knowledge of the subject. The teacher must have had the proper instruction himself. The summer course in agriculture and horticulture offered at the Missouri State University gives an opportunity for such instruction. The Bureau of Nature Study of Cornell University will give valuable assistance. The experience and practices of the

National Cash Register Company, of Dayton, Ohio, will show what has been done by systematic effort and will give him many valuable hints. His duty is to give such instruction to the children that they shall have right ideals. This may be done by blackboard drawings, by showing pictures of grounds properly planted, and by directing their attention to private grounds that show evidences of proper design.

The improvement of the school grounds will come very slowly, even with all the effort that may be put forth, until there are higher ideals and more interest is taken in the arrangement of the yards at the homes. If the home yards are mutilated by the miscellaneous planting of shrubs, trees and flowers haphazard about the premises so as actually to destroy that best setting for the home picture—the green lawn—it will be a difficult matter to make artistic improvements in the school yards. On the other hand, let the children be taught how to arrange the flowers, shrubbery and trees in the home plat so that the home shall be indeed a picture, and the improvement of the school grounds will come as a natural sequence.

The objection to adding instruction of this kind to the already crowded curriculum may be met by suggesting that the time be taken from the time now given to the study of the text book in geography. The ability to make the home surroundings beautiful at even less cost than is now incurred in the haphazard, inartistic attempts, is of greater disciplinary, practical and cultural value than the ability to tell the location of Timbuctoo, Jaalam Point or Calumpit.

If women's clubs will lend their assistance to the movement for more beautiful surroundings, a great impetus will be given to the effort being made to beautify the school and home grounds. To illustrate specifically, I mention what one woman's club has done in Carthage this fall. Prizes were offered for the school rooms having a window most artistically decorated with plants. The conditions were as follows:

1. All plants must be grown in the school building from cuttings, seeds, dormant bulbs or tubers.
2. The work must be done by the pupils as far as possible, and not by the teacher. Her work should be directive only.
3. The expenses must be borne by the pupils of the room.

4. An accurate account must be taken of all money spent in the purchase of boxes, pots, seeds, bulbs or cuttings.

5. It will be admissible to use rooted plants that may be obtained from the woods or growing wild, but no rooted plants may be taken from gardens or hothouses.

6. In deciding which rooms are entitled to prizes, account will be made of the selection, growth and vigor of plants taking into consideration the sun exposure; economy of expenditure compared with results; artistic arrangement; per cent of pupils in the room who prepare good papers upon the theme "Our Window Garden."

These window gardens have created a great interest in plants and the result of the experiences they have had will give pupils better ability to take part in the home contest that begins next spring. In this home contest, four prizes are distributed to those pupils of the schools who shall have the best and most artistic flower gardens on the home lot on an area not to exceed fifty square feet, the flowers to be annuals of the variety designated by the committee. Four prizes are also to be given to the pupils who shall have the most artistic vine plantings of annuals on house, porch, posts, fences or outbuildings. Pamphlets giving full instructions are furnished to each contestant and the teachers assist pupils in whatever way they are able to give assistance. Each contestant in this, as well as in the window contest, writes a complete history of his experiences.

Aside from these methods of bringing about improvement in school grounds, much may be done to make Arbor Day of permanent value. The results of years of plantings on Arbor Day have not been greatly to improve the appearance of the school grounds. In some cases trees and shrubs have been planted scattered through the grounds in such a way that if they were not destroyed by the pupils playing about them they became unpopular on account of restricting the play area. In other cases a considerable part of the grounds has been set apart for the nursery style of planting, with the result that "Keep off the grass" notices are in evidence, and yet no landscape contributing to the pleasure of pupils has been secured. Special efforts should be made to have Arbor Day plantings consist of hardy shrubs and trees set in such a way that they will not interfere with the play grounds, but shall serve either to

enclose the grounds or to furnish a screen for the outbuildings or other unsightly objects; or the planting of such hardy vines as may cover the fences or climb the buildings if they are of brick.

The change of school grounds from the persent depressing and degrading condition will not be brought about suddenly, but faith in the ultimate result on the part of those who realize the necessity for a change and are willing to give their energies to gring about such a change, will ultimately secure the improvement desired.—Colman's Rural World.

BUSINESS SAGACITY.

The farmer's business sagacity is certainly on the rise after years of ups and downs which bring experience as the hardest kind of a teacher. It used to be, when the lands of Michigan were first laid open for the farming industry, that the farmers would go in for just one particular kind of fruit, say peaches or apples, or pears, and make a specialty of that kind. If the winter was too hard for the trees, whole crops would be spoiled during the cold weather, and the farmer would find that he had lost many dollars, if, indeed, he was not completely ruined in a financial way.

But the farmers are learning every year, and one of the things they have learned is not to put their faith in one thing any more; one kind of fruit.

They are coming more and more into the way of setting several kinds of fruit trees and making arrangements for raising several kinds of berries, so that, if one or more of the crops fail, they will have something to fall back on. Every new farmer who has settled anywhere around Grand Rapids in the last year or two has prepared for a varied crop of fruit when summer comes.—Fruit Trade Journal.

SELL OR CONSIGN?

Editor the Southwest:

The production of choice fruit of all kinds is no longer a question of doubt, but the satisfactory disposition of it is, so far as profit is concerned, as was developed by the meeting of fruit growers last winter, and also by the State Horticultural Society, in Peirce City, Mo. The inquiry is not how much fruit to grow, but how to sell it and get reasonable pay for it. On that hinges the law of profit or loss.

When any business undertakes to produce, whether a crop of berries or other fruit, or any product of a factory, the proprietor assumes the risk of production, but it seldom occurs that he also assumes the expense of sending it to market and consigning it to unknown men to sell and accepting the pay that is remitted as the reward of his toil. Such double risk must have a small expense in its business and large profit to enable one to keep on.

The truth is, produce should not be sold in that way. Never in one instance go into a business to consign your product for your remuneration and profit. It does not come sure enough to make you feel comfortable. The tendency of the commission trade is to lower prices. The commission men solicit more goods than they can sell to advantage, and down go the prices.

Sell the product of your labor for cash in hand in your town delivered in good condition; then ends your responsibility and worry.

I do not wish to discourage growing berries, or any other product, but I do wish to oppose doing this at a loss to the grower, and I do not see how any other thing can result than loss when goods are consigned as is part of the fruit crop and other goods of the farmer.

Col. Evans was right when he advised people not to let a car wheel move till the contents were paid for. It is the only rational way of doing business.

It will be better for the farmer when he can sell all his product on his farm and exterminate the commission man's style of business.—A. H. Griesa, Lawrence, Kansas.

GET ACQUAINTED WITH THE CONSUMER.

Every grower of fine fruit should aim to get acquainted in a business way with his customers. I have a friend who grows superb berries, and in every box he puts a ticket giving his name and the variety of fruit, and in the largest type he says, "Price always five cents above the market price." With berries selling at eight or ten cents ordinarily, he gets five cents more, and that means a big profit. Can he sell them? Certainly. He sells more than any other grower in the county, and gets his price. Then, too, his berries are so fine and large he gets them picked for one-half cent less a quart than others, and he makes it pay both ways.

In the fruit growing of the future there must be a cutting down of the acreage of the majority of the growers. They must grow larger and better fruit, of greater beauty and higher quality, and the grower who gets the closest in touch with the consumer will get the highest price. Another thing will be the production on a tremendous scale by a few growers, by companies, with certain lines of fruits, in certain localities suited to them. The small growers might do better by co-operation, perhaps, as to methods of packing and selling and transportation, and it will bring more money to pay some specialist to place your products on the market in more desirable shape.—J. H. Hale—*Colman's Rural World*.

Now that the apple season has opened, the merchants find that the grower has lost none of his cunning in the preparation of his fruit for market. Every day, on Washington street we see barrels of apples opened which present a tempting array of fine large, uniform, handsome fruit on top; but when the purchaser digs down into the barrel, four or five layers, what a difference there is in the quality. Windfalls, small, rough and wormy apples fill the center of the barrel. For the honor of the fruit grower, we are glad to say that this is not always the case and that there are some shippers who have pride enough in their reputation to deal honestly in the matter of packing of their fruit. Would it not be a good idea for the commission

merchants to formulate some plan whereby persistent shippers of dishonestly packed goods could have their marks branded so that every purchaser would know just what to expect when buying one of these lots? A few drastic lessons of that kind would probably result in better packing. Another source of annoyance to the merchant is the short barrel, but that is believed to be only a temporary trouble and one that will soon be remedied.—Fruit Trade Journal.

HIGH-COLORED FRUIT.

Not only is high-colored fruit more attractive, but experience proves that its quality is also far better than that which has a poorer appearance. In many varieties of fruit not merely the market demand for it, but its eatableness, depends on its coloring. This varies much with seasons, soil, fertilizers, and general care of the tree. Some of these, especially the fertilization, are mainly within control of the grower. He can decide what shall be the character of his apples, at least as regards color. In the first place, an open growth of top is necessary, so as to let sunlight get to the foliage in the centre of the tree. It is not necessary that sunlight shall fall on the fruit itself. It is the leaf and the sunlight on it that does the coloring. But more than this is needed. If the tree is not well supplied with potash fertilizers its foliage will be defective and unable to do its appointed work.

When the fruit falls off before its seeds form, it is a plain indication that nature has protested against being required to perfect it with insufficient material. It is harder than the Egyptian bondage of the people of Israel, when they were required to make bricks without straw. If such trees had been fertilized with potash and phosphate months before, so that winter and spring rains would carry the mineral where the roots can get it, the foliage of the trees would be kept healthy, and if properly thinned, so as to let in sunlight, much more fruit could be perfected. Nature, however, almost always tries to do more than it can do well. Thinning the fruit, if done early enough, is a great help, not only to making the fruit larger, but in giving it a higher color.

It should be the aim of the orchardist to put his land, so far as he can in the condition it was when first cleared. He need not supply at once the extraordinary amount of potash and phosphate that came from burning the clearings of the original forest. But he should each year fertilize his orchard with enough of these minerals to perfect the crop that they will bear the coming season. No time should be lost in doing this, so that winter rains and snows may carry this fertility into the soil. There is no danger in an orchard that any kind of fertility will be lost through leaching away. Millions of roots are ready to grasp it, and each has at its tip end, where it feeds, carbonic acid gas enough to make available what it needs. If more mineral fertilizers were used on all fruit trees, leaf blight and other fungous diseases would disappear. With healthy foliage, and the judicious thinning of fruit in the years when it sets too much, some fruit buds would be produced even in the bearing years, and a moderate crop would be produced the following seasons. Many a man who has been disappointed in finding he could not sell his overabundant apple crop for enough to pay the cost of gathering, has found the following season that if he had entirely sacrificed this large crop, a much smaller crop the next year would have given him larger profits than his orchard has ever afforded.—*American Cultivator.*

SOMETHING YOU SHOULD KNOW.

**MISSOURI
FOR
FRUIT.**

**A FEW ITEMS OF INFORMATION ABOUT
THE FRUIT INTERESTS OF THE STATE
ALONG THE LINES OF OUR RAILROADS.**



WITH MAPS.

L. A. GOODMAN, SECRETARY.

Something You Should Know.

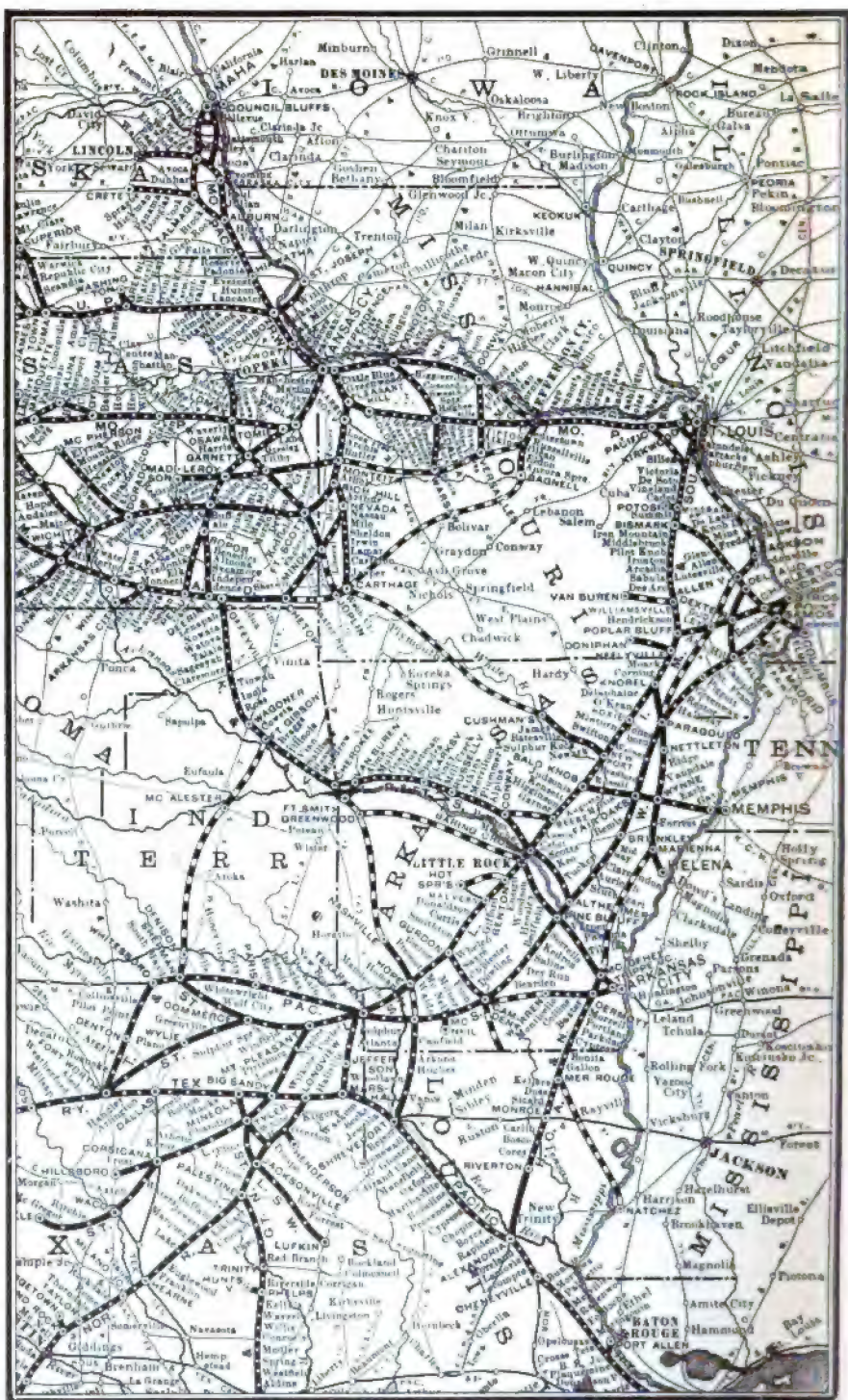
MISSOURI FOR FRUIT.

Occupying the position of advantage and of special adaptability for fruit-growing, proximity to the markets, and the best of railroad facilities, Missouri offers to the seeker after locations for raising fruit, more good fruit land than any other state of the Union, more variety of soil, and elevation adapted to fruit-culture, more of the loess land, the best lands in the world, more of the hills of the Ozarks, more of the river bluffs, more of the table lands along the water courses, and all, all of them, the very best of fruit lands, waiting for the settler to come and occupy, waiting for the orchardist to come and plant, waiting for the husbandman to come and develop what nature has so bountifully prepared for his use.

We have thought best to present to the seekers after homes a map of the railroads of the state, a list of the counties through which they run, and a short description of the advantages offered, along the line of each, to the fruit-grower, to the settler, or to the large commercial planter.

We wish also to thus notify the buyers of fruits, that along the lines of these roads are hundreds of thousands of acres of apple orchards many thousands of peach trees, and many hundred acres of small fruits of all kinds, and they can be reached from any of the markets of all this land. Buyers can find here in Missouri all the berries they want, car loads of the best peaches in the world, and thousands of car loads of the most beautiful, best selling apples of our country along the lines of these different railroads. Study these maps and these short descriptions, and then act on this information.

L. A. GOODMAN,
Secretary.



MAP OF THE MISSOURI PACIFIC AND IRON MOUNTAIN R. R.

THE MISSOURI PACIFIC.

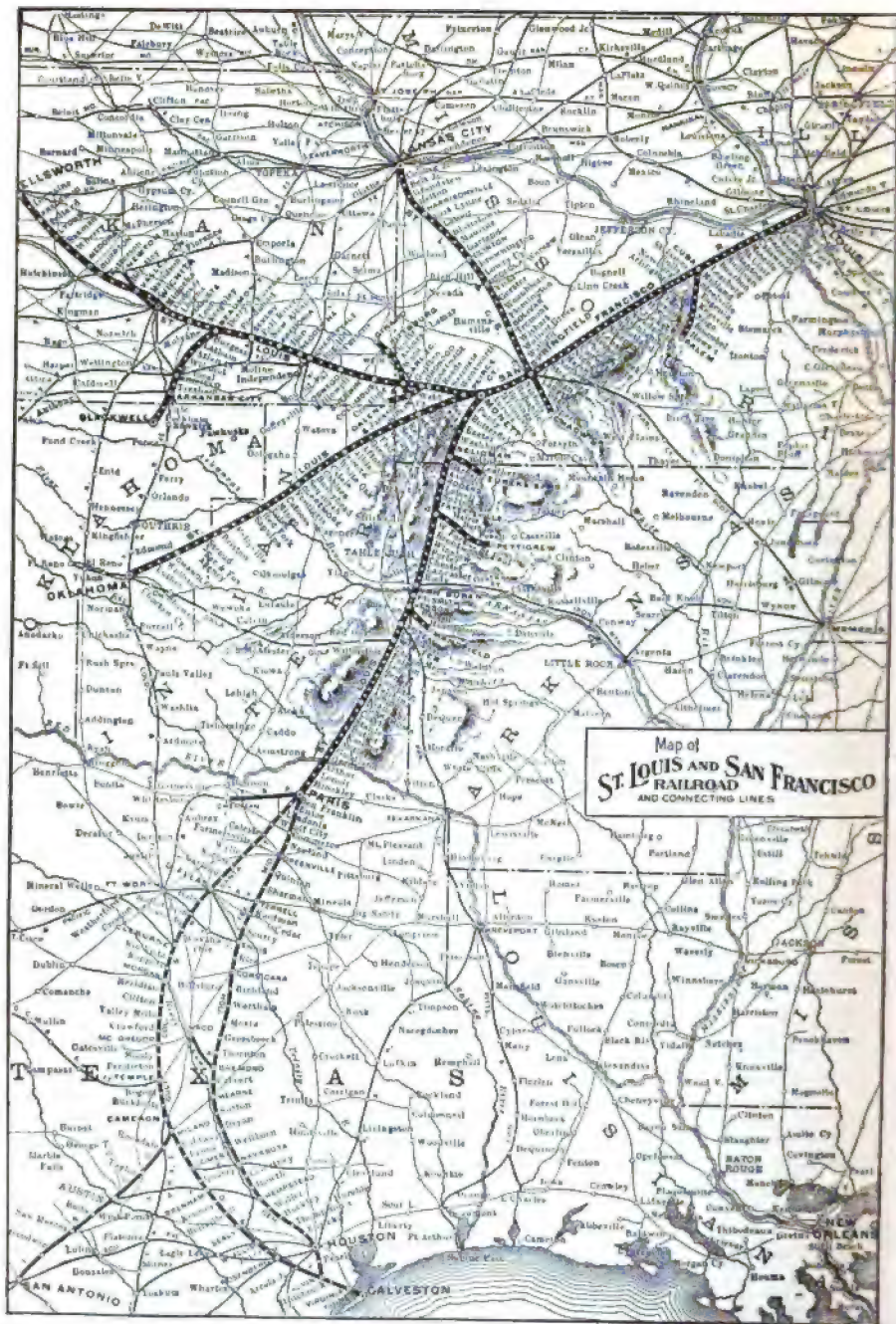
Beginning at St. Louis the road runs westerly along the south bank of the Missouri river over hills and vales, river bluffs and bottoms, across creeks and rivers through the counties of St. Louis, Franklin, Gasconade, Osage and Cole, until it reaches Moniteau county. All of these hill lands are peculiarly adapted to fruit-growing, and they await the hand of the orchardist to awaken the slumbering powers that lie dormant in their bosoms. In Moniteau county the beautiful, grand, rich, noble prairies of which the state is so justly noted, here begin. Then all through Cooper, Morgan, Pettis, Johnson, Lafayette, Saline and Jackson, counties we find these prairies interspersed with small groves or strips of timber along all the streams and in all the valleys. All of these wooded hills are made of a clay shale which are rich in tree growth and valuable for all kinds of horticultural products, small fruits, orchards, and vineyards.

Along the southwestern border of the state this road runs through the counties of Cass, Bates, Vernon, Barton and Jasper. No better soil is there in all the world than some of these grand prairies of western Missouri. Here also the hills and timbered lands are so well fitted for orchard growth that the wonder is why they are not covered with orchards. In Jasper county are the best zinc and lead mines in the world and the land above them is the best of fruit land also. Coal also is abundant under many of these best orchard or grass lands.

THE ST. LOUIS AND IRON MOUNTAIN.

Also beginning at St. Louis. This road runs south, through the counties of Jefferson, Washington, Iron, Madison, Wayne, Butler, Bollinger, Cape Girardeau, Scott, Mississippi, New Madrid, and Stoddard. giving a great variety of soils, subsoils, forests, prairies, and rich bottom lands. The first few counties covering the Ozark range are, by nature, prepared for the best of tree growth, the greatest of products, and the finest of quality, in all our fruits.

Here you will also find those peculiarities of location and elevation that invariably give the best results to the fruit grower. Again, no where in the west can you find such mines of iron and lead and stone and granite beneath the surface. The lower lands of the Mississippi river bottom are the best of all those noted river bottom lands, while here and there rise hills for the profitable growing of all fruits if they are only utilized. These fruit lands can now be had cheaply, but will be worth many times their value in a few years.



THE ST. LOUIS AND SAN FRANCISCO.

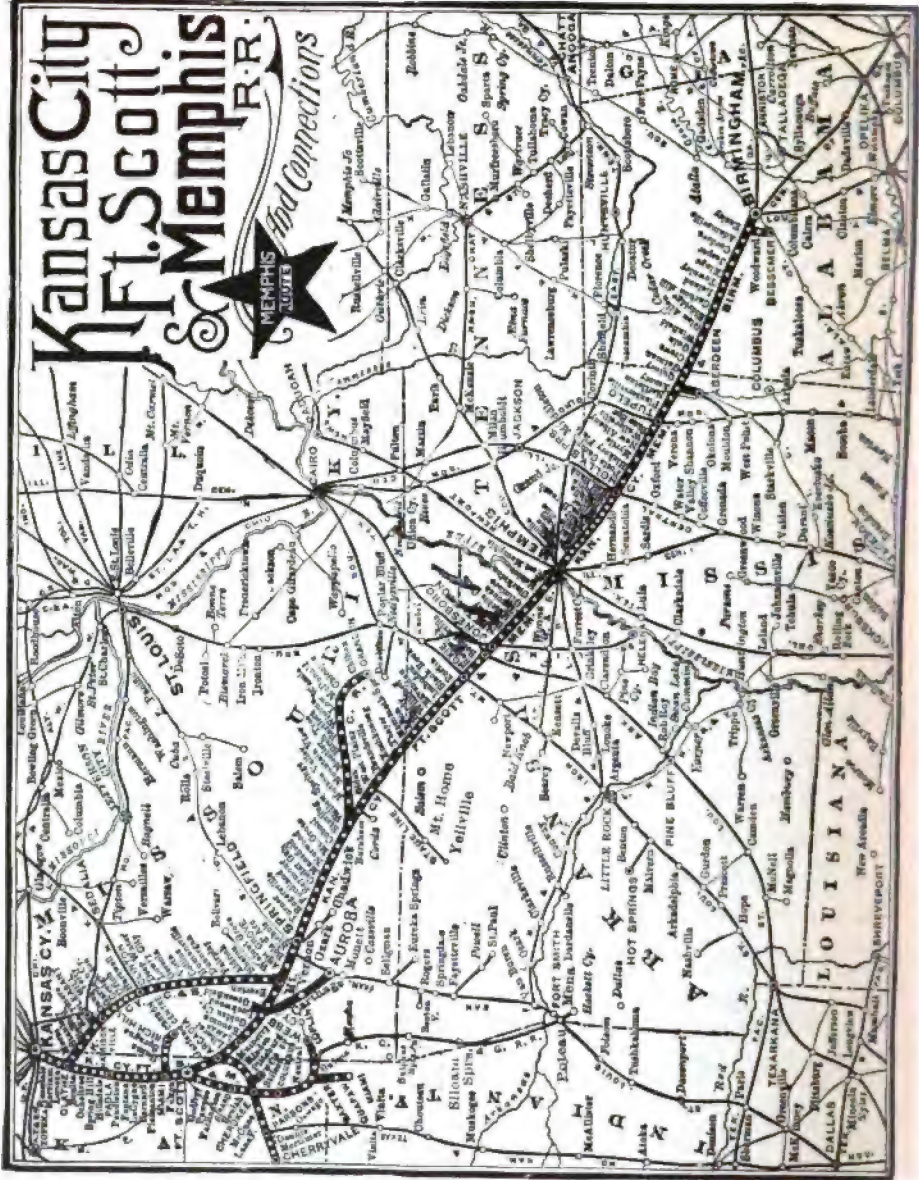
Beginning at St. Louis it follows the line of the Ozark range, bridging numberless creeks, streams and rivers all the way across the state in a south westerly direction; passing through the counties of Franklin, Crawford, Dent, Phelps, Pulaski, Laclede, Webster, Green, Christian, Lawrence, Barry, Newton, Jasper, Polk, Cedar, Hickory, Henry, Johnson, Cass and Jackson.

With the exception the last four counties the road is almost wholly within the Ozark mountains. These mountains, or rather hills, for in many places you can not recognize any mountains at all, only large table lands; on the mountains are the lands that in every way are suited to the making of the horticulturist's home, for the growth of all kinds of small fruits, peaches and apples. These red lands of the Ozarks are the home of fruits, and it is only necessary for us to find the proper porous subsoil and good top soil, when we can then plant with assurance of success. These lands are now very cheap, and when the black jack forest or the pine timber has been removed we can then profitably convert them into orchards, that will pay many times the value of the timber taken, and continue to pay well for years to come. Thousands of acres are ready for the orchardist to develop.

Here you will find the soil that gives the highest color, the choicest quality, the finest of texture and the greatest quantity in apples, of any place in all this broad land of ours. Missouri offers untold advantages to the one who will go up and possess them. Here you will find the most desirable climate for the production of these fruits in abundance, perfection and beauty.

The elevation, the location, the soil, the climate, then, are what we want, and this soil of Missouri is so rich in all tree growth material in the iron that colors the fruit, in the potash that makes the wood, that we need not fear to so locate, so plant, so cultivate and so gather of these beautiful and pure and good fruits, that it will gladden the heart and give health, and dollars to line the pockets of the apple grower.

Kansas City Ft. Scott & Memphis R.R.



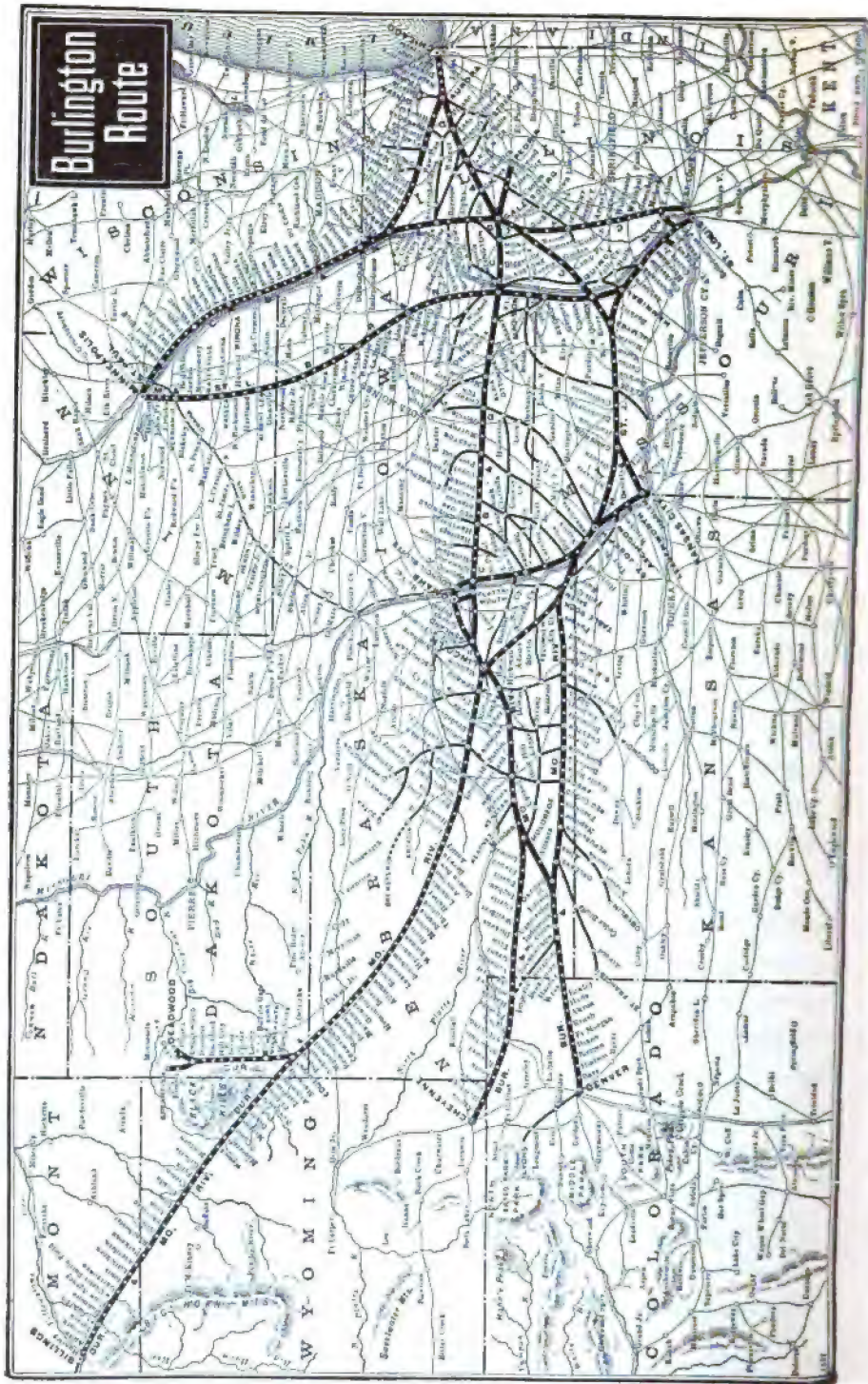
THE KANSAS CITY, FT. SCOTT AND MEMPHIS.

Begins at Kansas City and passes through the rich, and valuable prairie lands of Jackson, Cass, Bates and Henry counties. These prairies are crossed by many creeks and small rivers, along the bluffs and banks of which are small strips of timber lands which are underlaid with a porous or gravelly subsoil, each of which is well adapted to the production of all our western fruits, apples and peaches. The small fruits are especially profitable in all these counties and have a good outlet to the markets.

This railroad runs on southeast through St. Clair, Polk, Greene, Webster, Wright, Texas, Howell, Oregon, Shannon, Carter, Dade, Barton, Vernon, and Jasper counties. All of these counties are more or less in, and on, the Ozark mountains, "The Land of the Big Red Apple." These lands are all more or less adequate to berry, peach and apple growing. While all the land is not equally valuable yet if care be taken with the proper location and the red porous subsoil that will let the rains through during the wet season, and hold the moisture during the dry season, no one need fear for profitable returns from his orchards.

These are the very lands suitable for tree growth, and for the development of good, sound, well-colored, juicy and perfect fruit. They contain all the elements needed, as, a rich surface soil; porous subsoil, containing fragments of disintegrated lime rock, iron and marl; a needful elevation, and by that natural drainage to promote a healthy tree growth. Our hills are rich from the foot to top in building materials, fuels and precious metals. And why are these hilly lands of our state so highly favored for the growth of fruit? They are located in a state blessed with a temperate climate. These hills afford a healthy location for man and beast, and for vegetation. The swift currents running alongside carry off with them the cold blast and prevent Jack Frost from doing damage in early fall and late spring.

Burlington Route



THE BURLINGTON RAILROADS.

THE HANNIBAL AND ST. JOSEPH.

Beginning at Kansas City and running north and east through the wonderful, rich counties of Clay, Clinton, Caldwell, Livingston, Linn, Sullivan, Putnam, Chariton, Carroll, Macon, Shelby, Monroe and Marion, we have some of the most valuable as well as productive lands of the state. All along are marvelous prairies, beautiful timber, grand water courses, rich soils, well adapted to orchard planting, and all kinds of farming and stock raising. Many of these bluffs and hills are of the loess formation, the most valuable of all our fruit lands. The sub-soil under all these loess lands is of the same material and so porous that the extreme wet or extreme drouth does not prevent the proper growth and development of all orchard fruits.

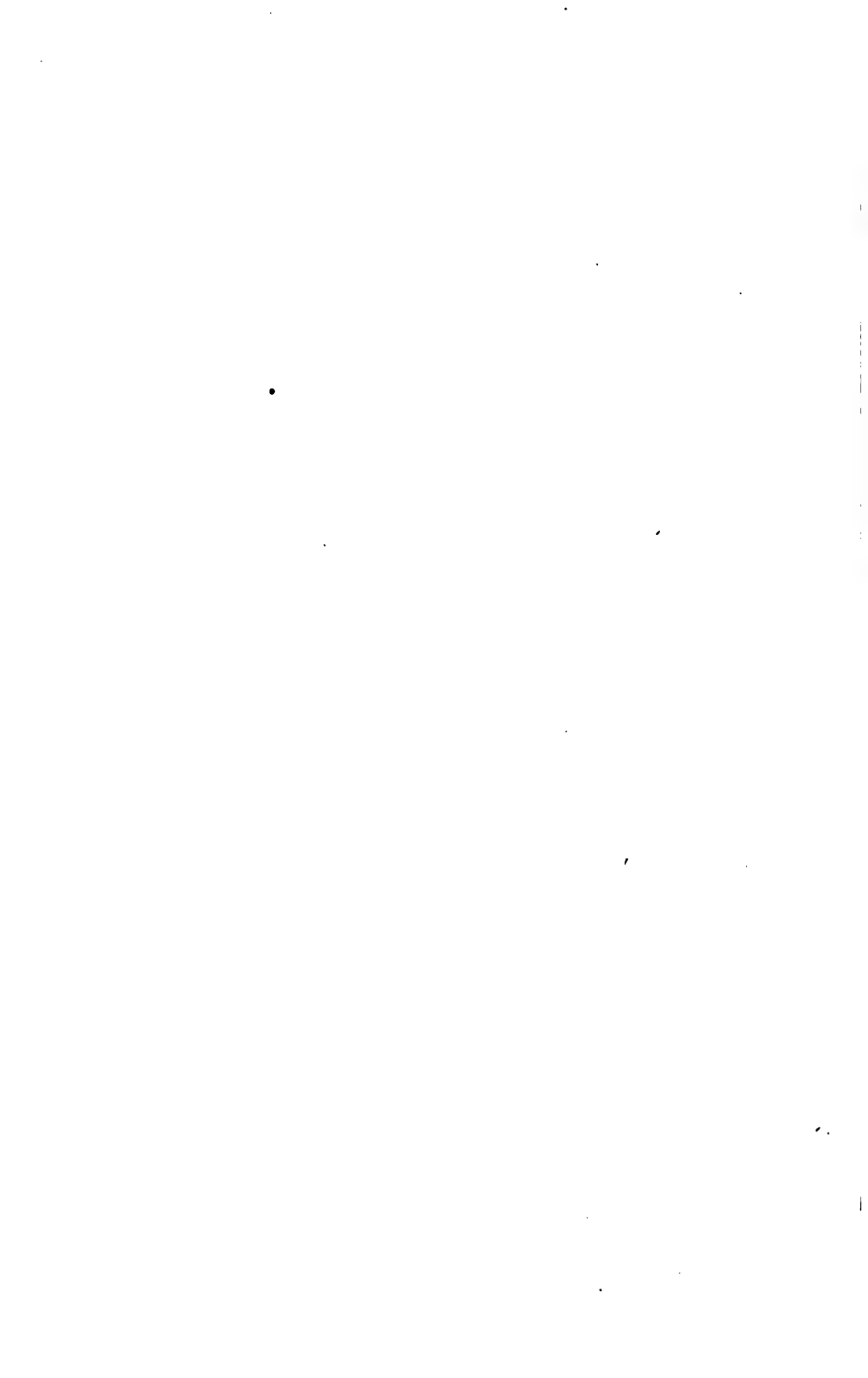
THE ST. LOUIS & KEOKUK LINE.

Following the west bank of the Mississippi river to the Iowa line, touches the counties of St. Louis, St. Charles, Lincoln, Pike, Ralls, Marion, Lewis, and Clark, and these river bluffs are all of them specially valuable for the horticulturist, in the growing of orchards and small fruits. These timber lines seem to have been prepared by nature and the growth of the timber for the fruit grower's special purpose. Many of these lands close to the very best markets, are still very cheap and they will all make good homes if the man will but plow, plant and care for the trees.

KANSAS CITY, ST. JOSEPH & COUNCIL BLUFFS LINE.

Beginning at Kansas City passes along the east bank of the river through the counties of Clay, Platte, Buchanan, Andrew, Holt, Atchison, DeKalb, Gentry and Harrison. All these lands along the Missouri river bluffs are of the loess formation, and are among the best of all the fruit lands in this western country, if not in the world. This soil is the same, in many places, down to the depth of five, ten or twenty feet and so porous that wet nor drouth seem to affect the growth of our fruits. The elevation, the proximity to the large streams of water, and the broken character gives excellent air drainage so that the certainty of a crop of fruit is almost assured. Many of these lands can be had for \$10 to \$20 per acre.



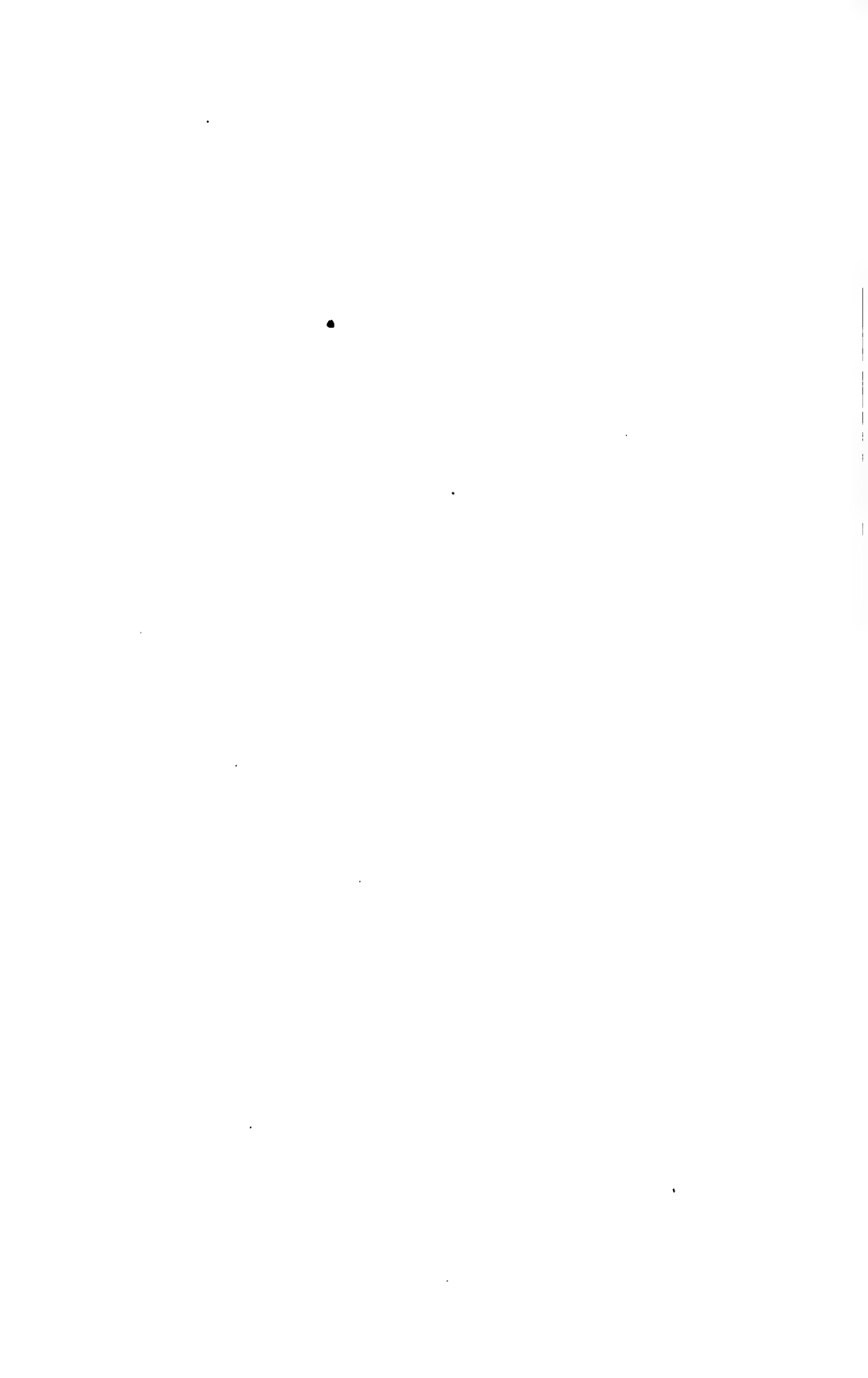


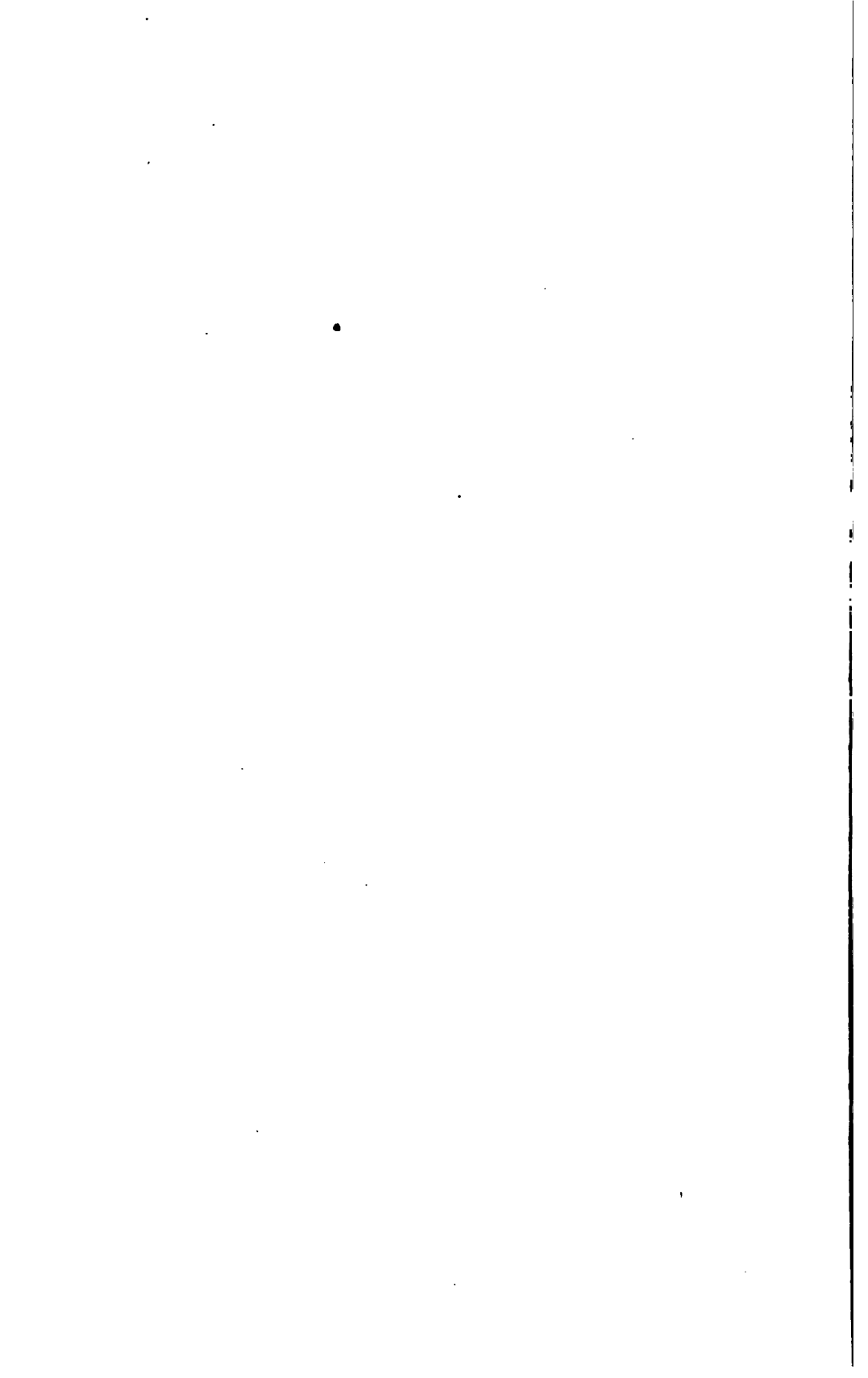


THE KANSAS CITY, PITTSBURG & GULF.

This road, with its branches, passes through more degrees of latitude than any other road of the state. Beginning at Kansas City it goes through some of the most fertile of our rich prairie counties, touches the richest coal, lead and zinc fields in the world, goes up and over to the southern slope of the Ozark mountains, and crosses the most beautiful streams and by the clearest springs of pure water, until it leaves the state close to its western line. It runs through the counties of Jackson, Cass, Bates, Vernon, Barton, Jasper, Newton, and McDonald. While there are thousands of rich prairie farms along it, yet we find also other thousands of choice fruit locations awaiting only their development. Lands on the Ozark mountains are still to be had cheaply, \$5 to \$15 per acre, and these lands will make homes and orchards for hundreds of men before many years. Along this line is the largest orchard in the United States, owned by the Ozark Orchard Co., of Kansas City, and embracing 2,300 acres—33,000 peach and 133,000 apple trees, all from one to five years old.

These Ozark hills are full of minerals, but the best money to be had out of them will be for the fruits they will produce. Although lying about latitude 37 degrees, yet the altitude of 1,500 feet gives a climate cool enough for the best maturing of the apple; and the soil has iron and lime enough to give the best color to our fruits, as well as the best quality. The pears and peaches are so far ahead of the California fruits that one has only to taste to be satisfied. The peculiar location of this country, its elevation, freedom from heavy winds, abundance of rainfall, protection by the highest peaks and pine timber, peculiar red lands (always fruit lands), the many streams and springs, nearness to market, quick communication, low price of land, growth of timber, all prove to me that this is one of the most favored parts for fruit growing.





.

.

1875

1875

1875

THE OMAHA, KANSAS CITY & EASTERN.

This branch runs from Kansas City into Clay, Clinton, De Kalb, Daviess, Gentry, Nodaway, Atchison, and also passes through many of the older and wealthier portions of these counties. All along the streams are the finest sites for fruit planting, and soils abounding in fertility. Over and over again can you find something that will pay you to investigate and to plant in orchards. Very many of these new locations are improving rapidly and it gives a good opportunity for the new comer.

ST. LOUIS & OMAHA BRANCH.

Runs from Pattonsburg, Daviess county, through Grundy, Sullivan, Adair, Knox, Lewis, and Marion counties. All of these counties along the northern portion of the state are good stock and grass lands and yet many of the water courses have places all along them suitable for growing the more hardy varieties of apples, and especially of cherries. This road, crossing as it does, the valleys of the Grand river, Chariton river, the bluffs of the Mississippi river, offers many opportunities for profitable fruit growing.

.

.

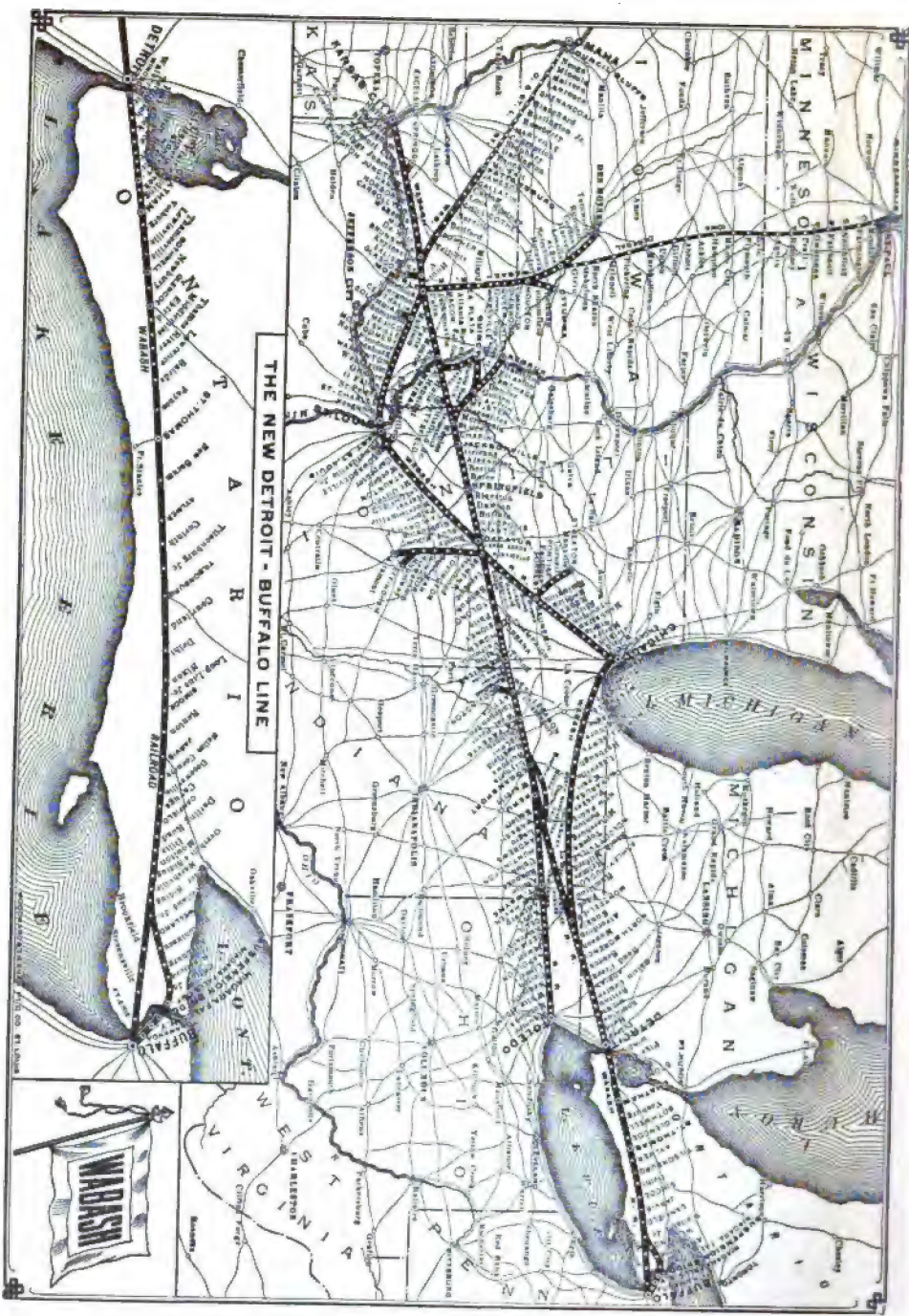
.

.

THE MISSOURI, KANSAS & TEXAS ROAD.

Running as it does from the southwest part of the state and crossing it diagonally to the northeast part, passes through a great variety of soils and climate and we thus find all kinds of soils and locations where apples, peaches, grapes, and all the berries can be grown profitably. Entering the state in Vernon county, with a branch reaching Kansas City, the road passes through Bates, St. Clair, Henry, Pettis, Cooper, Howard, Randolph, Monroe, Ralls, and Marion counties. Then a branch follows the north side of the Missouri river through Boone, Callaway, Montgomery, Warren, St. Charles, and St. Louis counties. Here you find hillsides and ridges that are simply waiting for some one to plant the orchards, which he will only have to care for and cultivate well to make them valuable mines for the future. Much of the loess formation is along the bluffs also.

No person can make a mistake in purchasing the cheap lands in Missouri all along our creeks, streams or rivers, where they are now mostly covered with a forest growth. Take these lands and chop, clear, burn off the brush or timber and plant to orchard trees. No person need fear that the cheap lands of Missouri will ever be any less in price than at this very time. Careful selection of some of these lands for future orchards and prepared in the proper manner for orchard growing will bring their owners two, three, five times the money spent on them if it be done in a legitimate manner and planted with the proper varieties. These cheap lands will be worth in a few years threefold the purchase price, and if planted in orchards will pay a wonderfully big per cent on the investment.



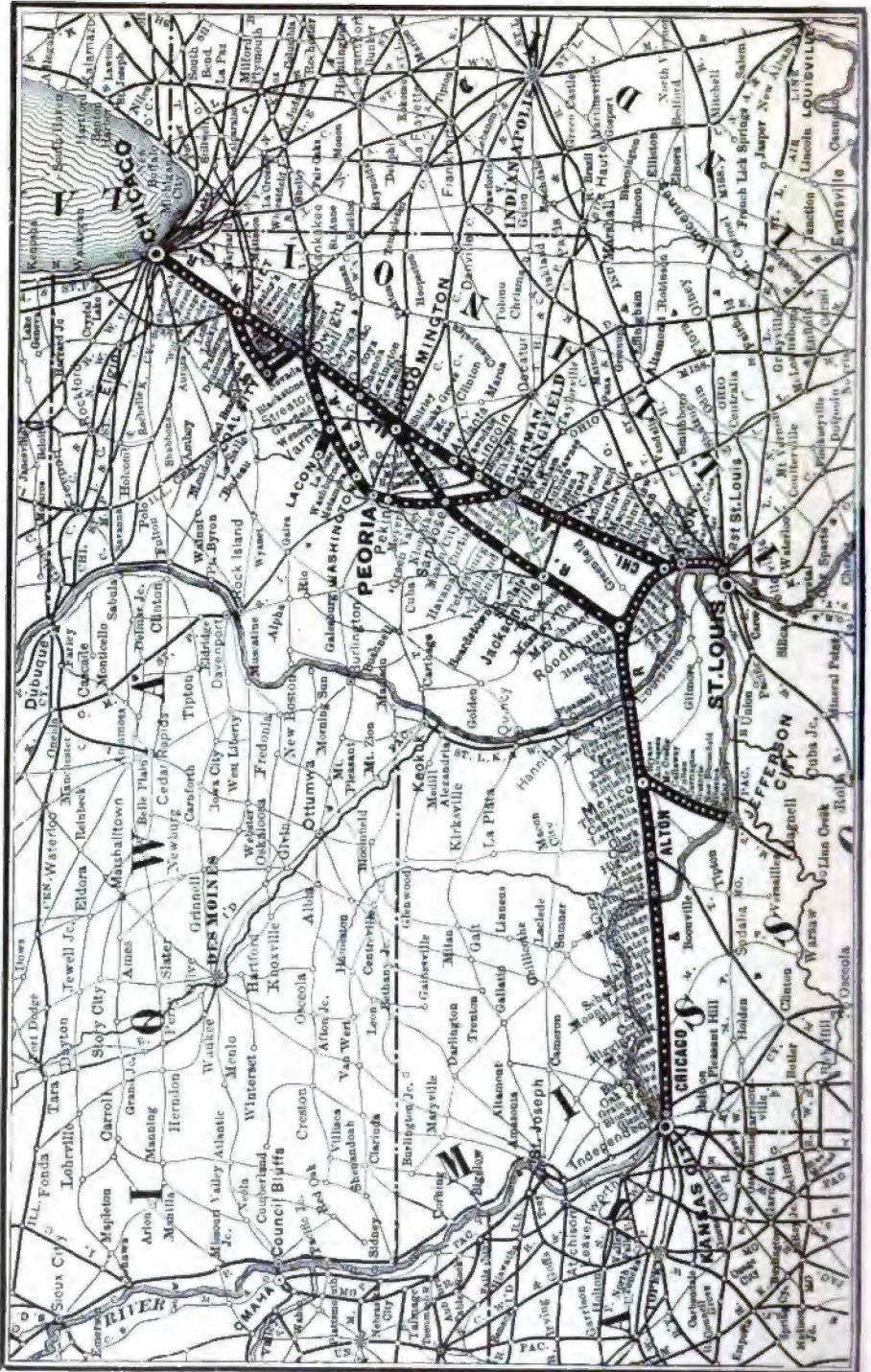
THE NEW DETROIT - BUFFALO LINE



THE WABASH RAILROAD.

Beginning at Kansas City, passes through some of the richest river bottoms and the grandest prairies of the state, productive in everything that goes to make a country valuable. Horses, cattle, mules, sheep, hogs, grains and grasses as well as fruits on the hills are all grown in quantities. These counties are rich, well settled and yet only a very small portion of it is in productive orcharding. For good openings to the fruit grower these counties offer the lands adapted for the purpose and many good markets for the use of the products by the large cities, towns and villages where there is not fruit enough grown to supply the home demand. These counties are Jackson, Clay, Ray, Carroll, Chariton, Livingston, Daviess, Randolph, Boone, Audrain, Montgomery, Warren. St. Charles, St. Louis, Macon, Adair, Schuyler. To give the advantages of each would be too much for this outline and we only wish to add that you will find thousands of locations for profitable fruit growing along this line, and suitable soil, the right climate for the growing of apples in a commercial way. There are plenty of valleys to draw off the cold air and protect the fruit from destruction by late frost in spring or severe cold of winter.

There may be hills in our state—which are not fit for fruit tree growth, nor fit for any agricultural or horticultural purposes whatever, but what I say and what I know is that the Missouri hills bordering on the running waters of the rivers and their tributaries are the kind of hills for tree growth and the natural field for the orchardist. They afford a high, dry, healthy location for the home of the husbandman and his family, and for the production of good, sound and perfect fruit, may it be in small fruit or in tree fruit.



THE CHICAGO & ALTON ROAD.

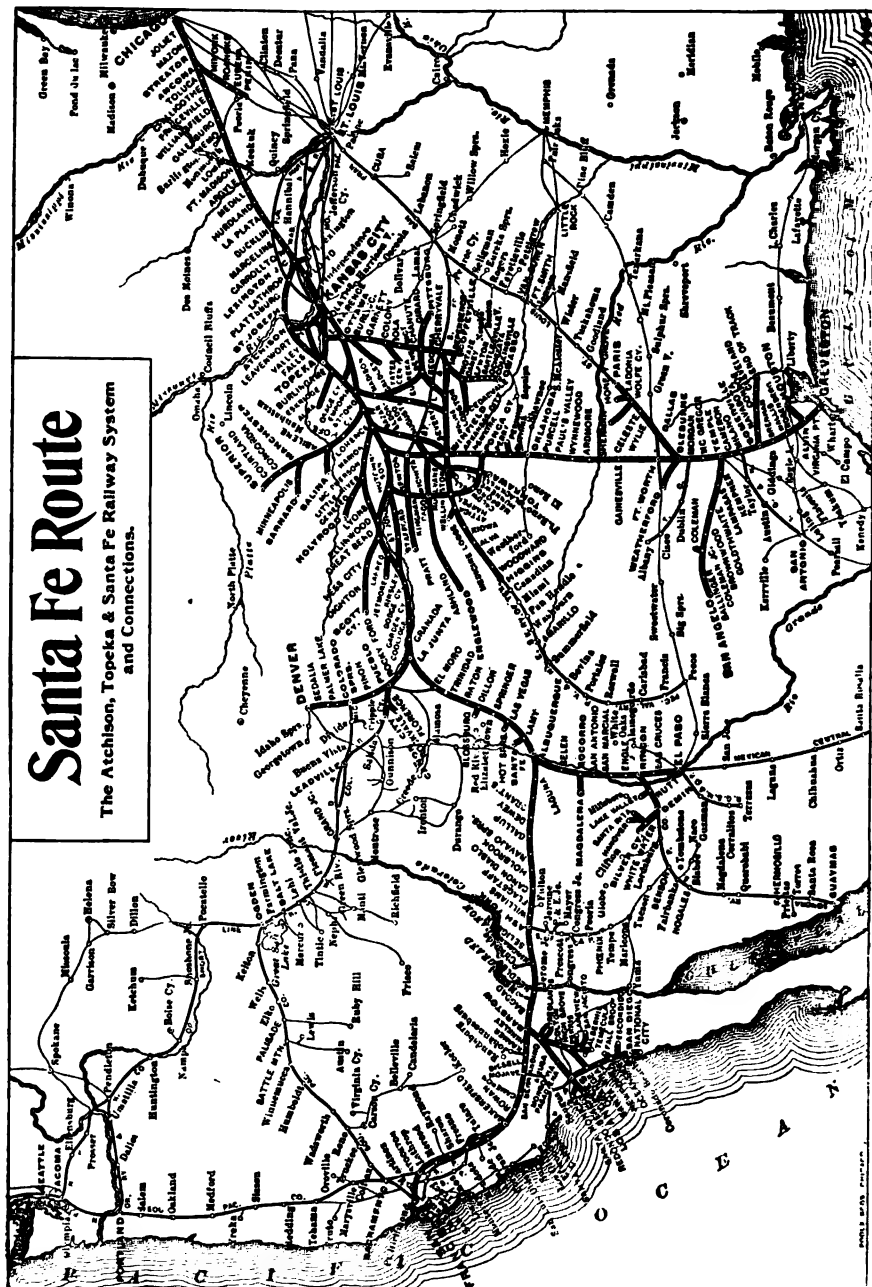
THE CHICAGO & ALTON ROAD.

Runs through part of the "garden spot of the west." The counties of Jackson, Lafayette, Saline, Howard, Randolph, Audrain, Boone, Callaway, Pike, and St. Louis give a line of counties which will be found hard to even equal in all this land of ours. All along and across the many streams of these counties you will find the peculiar formation, the character of soil, the proper subsoil, the position and adaptability of the lands to orchard growing if but care and good judgment are used in the situation and the varieties used. The timber lands along the streams are just such as are wanted for the best development of the fruits of our state. Along the road also, you will find some of the best smaller cities and villages of the state and they have never yet been supplied with enough good fruit to fill their markets.

Orcharding is a great big question. It is a word that has not been known in its full meaning until of late years, and especially so in the west. Not many years since if you had told a person that you were going into the work of "Orcharding" he would hardly have known what you meant. To-day we have hundreds of men who are "Orcharding" in the truest and fullest sense of the word. Years ago a person would have been thought wild who would plant an orchard of 100 acres. To-day we find them by the hundreds over our western country and many another who is planting 300 acres, 400 acres, or perhaps even 1,000 acres. Now we are no more astonished when we hear of some one planting two or three or more hundred acres of apple or peach orchards. The man now seems to go into it just as any other business man goes into his business.

Santa Fe Route

The Atchison, Topeka & Santa Fe Railway System and Connections.



THE ATCHISON, TOPEKA & SANTA FE ROAD.

Runs northeast through the state; starting at Kansas City, through Jackson county and crossing the Missouri river at Sibley, where overhang the river those great Missouri river bluffs, rich in all kinds of tree growth material, and hence in orchard growth as well. Then crossing Ray, Carroll, Chariton, Linn, Macon, Adair, Knox, Scotland and Clark counties, it also passes through thousands of acres of good fruit lands. Many of these lands are more valuable for the production of some of the northern fruits than is the southern part of the state and there is needed only study to know the suitableness of the soil and subsoil for certain fruits, like the cherry, that persons to make much money in growing them. This northeast corner is also specially adapted to the growth of certain apples like the Jonathan and Grimes Golden, and money is to be made in growing them.

From a few thousand of barrels of apples the production has grown and grown until now we see that Missouri often stands first in the quantity, quality and value of her apple crop. The development has been a gradual and uniform one, that has made the state known all over the country as the "Fruit State of the West." Pears, cherries, plums, strawberries, raspberries, blackberries, grapes—who shall number the bushels, or crates, or boxes of all these fruits that have been put on the market, to say nothing of the quantity used at home? In 1897 the apple crop was worth \$12,000,000, the peach crop \$3,500,000, pears, cherries, plums and grapes \$1,500,000, and the berries \$2,500,000 more, making the value of our fruit crop worth \$20,000,000.

If any gold mines or silver mines, or lead or zinc mines, or coal mines should have such a yearly return, the world would go crazy over the speculation. And yet right here, quietly and surely, the returns come to us and nothing more is said. I could give you hundreds of instances where the fruit crop paid more than the farm was worth—sometimes \$60, \$80, \$100, \$150 or even \$200 per acre.



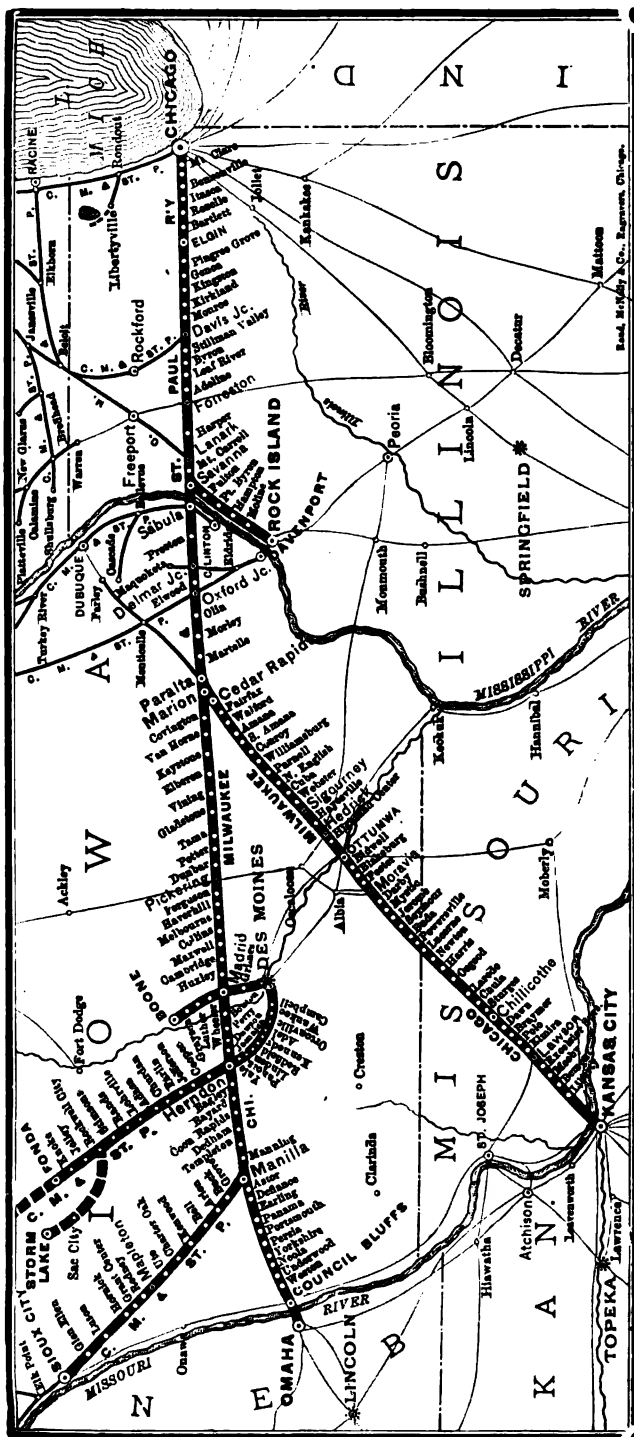
THE CHICAGO, ROCK ISLAND & PACIFIC LINE.

Runs through the counties of Jackson, Platte, Buchanan, Clinton, DeKalb, Daviess, Grundy, and Mercer, and crossing the richest prairie and timber lands of west Missouri and the numerous branches in the Missouri and Grand river valleys, provides many opportunities to the orchard grower for profitable investment. While there are many locations where grass lands and stock raising are more fitting to the localities than is fruit growing, yet the high lands along the rivers and streams are, many of them, underlaid with a good subsoil suitable for orcharding and good openings are ready for you if you choose to take them.

If you want an orchard plant one-half Ben Davis, including Gano. In the north half of the state Jonathan will come in second, and Winesap, which includes Mammoth Black Twig, an improved Winesap, should come in third. Next would come York Imperial. In this northwest corner of the state an orchardist can and has cleared \$100 per acre from his orchard.

Plum culture in the northwest has been built on our native species, and this industry may reach that permanent success already attained in grape growing. That it has grown in a few years to such magnitude without any special efforts seems marvelous, and clearly indicates the intrinsic value of our native plum.

The counties on this road offer every element necessary for the success of the fruit industry. The fertile hills and rich bottoms are eminently fit for fruit growing; atmospheric and water drainage are excellent, rain and sunshine (so important in ripening) are well balanced. The apple crop seldom fails, pears can be raised and shipped with profit, blackberries are luxuriant, all small fruits grow readily and the strawberry beds are generous in giving returns. And facilities for railroad transportation to profitable markets are complete.



THE CHICAGO, MILWAUKEE & ST. PAUL ROAD.

THE CHICAGO, MILWAUKEE & ST. PAUL ROAD.

Beginning at Kansas City, opens a way through Clay, Ray, Caldwell, Carroll, Livingston, Grundy, Sullivan, and Putnam counties. It crosses what is known as the Grand River Valley, and its many tributaries, thus giving a vast number of the most desirable locations on the hills along the little streams and yet having plenty of low lands and water courses to carry off the cold air. The road passes through some of the oldest settled portion of the state and many of these old southern farms are better adapted to fruit growing than to the stock farms for which they are used.

WORK OF THE SOCIETY.

Our work is first one of development, of advertising our possibilities, of securing the best localities for orchards, and of finding out the adaptability of different fruits to different locations, soils, and climates. Second, one of concentration of our effort to do well and scientifically what should be done, to properly care for what we have undertaken, and improve varieties and methods. Third, one of instruction, that is trying to have the right thing done in planting, in cultivation, in fighting disease and insects, in pruning, and finally in packing, marketing and transportation. The good accomplished is, first, by showing that we are a live people and a live Society in developing our resources; second, by proving to outsiders that Missouri is a great fruit producing country; third, it creates an interest among our own people in these fine fruits; fourth, it helps to increase an appetite for fruit instead of meats among our city people; fifth, it educates the people as to varieties, productiveness, hardiness and keeping qualities; sixth, offers the buyers an opportunity to compare varieties grown in different sections and locate them; seventh, gives the counties an increased prominence, people soon begin to inquire where it is, and what kind of people live there and what lands are worth, the kind of soil, the waters, the prairies, the timber, products, and soon are going there to examine them for themselves—One tells two, two tell four, four tell eight, and already they are coming to Missouri to settle.

L. A. GOODMAN,
Secretary.

INDEX.

A		PAGE.		PAGE.
Address of welcome, Jos. French..	14		Bordeaux Mixture	395
Address of welcome, Hon. Martin			Business methods in horticulture.	
Read	158		Z. T. Russell	140
After cultivation, gathering and			Business sagacity	444
marketing, D. A. Robnett.....	162		Burlington railroads	459
Agriculture in schools, W. J. Ste-			C	
vens	101		Canning discussion	59
Apple Basis, the new.....	341		Canning, surplus fruit, Mrs. W.	
Apple canker	391		B. Chambers	150
Apple crop, gathering and market-			Catch crops, W. E. Farmer.....	385
ing the, A. Nelson	194		Cherries, Prof. W. A. Waugh.....	363
Apple, diseases of the, Prof. J. C.			Cherries in Mo., will it pay to	
Whitten	206		plant, G. W. Hopkins.....	215
Apple eaters league	341		Cherry orchard, best soil, location.	
Apple growers' meeting, national.	351		varieties, etc., J. J. Kiser.....	208
Apple growing, pruning, etc., J. P.			Cherry pits, sprouting	364
Sinnock	170		Cherry, pruning, planting, market-	
Apple orchard	340-343		ing, W. H. Skinner.....	211
Apple orchard, a stream in an...	350		Chestnut culture, improved, J. H.	
Apple orchards pay. will, N. F.			Hale	424
Murray	344		Chinch bugs, to destroy.....	406
Apple packages, importance of uni-			Cold storage	435
form, J. T. Snodgrass	126		Committee on agriculture in schools,	
Apple pests	400		report of, W. J. Stevens.....	101
Apples, loss on	271		Committee on Horticultural educa-	
Apples, planting, varieties, etc.,			tion, meeting of	115
J. P. Canaday	175		Committee on horticulture, secreta-	
Apples, preparation of land, laying			ry's report	96
out, etc., J. H. Karnes.....	180		Committee, report of flower	85
Apples, some New Ark. seedling.			Committee, report of fruit	86, 262
Prof. J. T. Stinson.....	243		Committee, report of obituary	88
Apple tree root rot, Prof. H. von			Committee, report on canned	
Schrenck	225		goods	87
Apple trees, growing, handling, etc.,			Committees appointed	26, 169
E. L. Mason	172		Committees, standing	4
Apple varieties	179, 180		Constitution	6
Atchison, Topeka & Santa Fe R. R.	471		Constitution amended	279, 289
B			Constitution, model	8
Bees	418		Consumer, get acquainted with	
Bees, wintering in Mo., A. L. Riley	418		the, J. H. Hale	446
Bees, wintering	421		Copper carbonate	395
Ben Davis	182		Copper sulphate	396
Birds, a plea for, Grace Cade....	422		County fruit reports	89
Birds, to protect the	423		County societies, list	11
Birds, discussion on	316		County society reports	253
Birds, resolution on protection of	316		Cultivation	384
Bitter rot in apples.....	391		Cultivation, crops, pruning, etc.,	
Blackberries, discussion on	47		A. Patterson	192
Blackberries in the orchard.....	290		Cultivation, crops, tools, etc., H.	
			W. Jenkins	190

Chicago and Alton road.....	469	Fruit, what to do with surplus,	
Chicago, Rock Island and Pacific	473	Mrs. W. B. Chambers.....	150
Chicago, Milwaukee and St. Paul	475	Fumigation	403
D		Fungi	391
Dewberry, a brief article on the		Fungus, cedar apple, Prof. Whitten	393
Lucretia, F. H. Wild	48	G	
Discussion on apple diseases.....	207	Gathering and marketing the ap-	
Discussion on apples, varieties..	187	ple crop, A. Nelson	194
Discussion on blackberries.....	47	Gooseberries, successful culture of,	
Discussion on canning	59	F. S. White	380
Discussion on cherries	216	Grape bulletin, Prof. Whitten....	367
Discussion on dewberries	49	Grape, the Sam'l Miller.....	303
Discussion on distribution	121	Grapes	306, 367
Discussion on grapes	56, 313	Grapes, cultivation and best vari-	
Discussion on horticultural educa-		eties, Henry Wallis	49
tion	113	Grapes, cultivating, trellising, mar-	
Discussion on insects	58	keting, etc., C. F. Rueggsegger.	310
Discussion on orchards	186, 196	Grapes, discussion on	56
Discussion on peaches	224	H	
Discussion on pears	302	Healthful homes, Mrs. J. R. Mill-	
Discussion on plums	222	ner	131
Discussion on raspberries	45	Hedges	428
Discussion on strawberries	31	Hellebore	396
Discussion on transportation	122	Honey-dew, J. J. Kiser.....	291
Discussion on Uniform packages..	128	Honey, keeping	420
Discussion on winter injury.....	124	Honey, wholesome	420
Diseases	391	Horticultural books	103
Diseases of apple, Prof. Whitten..	206	Horticultural education, Mrs. G.	
Diseases of cherry, Prof. Whitten.	219	E. Dugan	112
Diseases of pear, Prof. Whitten...	301	Horticultural education, report of	
Distribution of small fruits, best		committee on, G. B. Lamm....	197
plan in, G. T. Tippin.....	116	Horticulture, some thoughts on, F.	
Distribution of strawberries	42	H. Speakman	143
E		How rock becomes soil, H. B. Can-	
Entomology	394	non	433
Entomology and horticulture, Mary		How to keep the boys on the farm,	
E. Murtfeldt	108	J. C. Evans	148
Entomologist, nurseryman and ...	430	Hannibal and St. Joseph R. R....	459
F		I	
Farewell words	329	Injury by drouth, can we help the	
Fertilizer, nitrate of soda, Prof.		trees, J. E. May	197
A. T. Jordan	376	"Insecticides and spraying"	111
Fertilizers, Swift & Co.....	282	Insects, apple, Prof. J. M. Sted-	
Floral infatuation, An author's...	408	man	203
Flowers, cultivation of, Mrs. E. L.		Insects, discussion	58, 206
Parker	16	Insects of the pear, Prof. Sted-	
Flowers for the yard, seeds and		man	301
greenhouse, C. I. Robords	71	Insects of the cherry, Prof. Sted-	
Flowers, the ethical and practical		man	218
value of, Mrs. G. E. Dugan....	75	Insects spend the winter how, M.	
Flowers, the Six Best from Seed,		V. Slingerland	398
Mrs. G. E. Dugan.....	165	Invitations for places of meetings	280
Forestry	426	K	
Freeze, general conclusions on...	386	Kerosene emulsion	396
Fruit buds, Prof. W. R. Lazenby.	431	Kerosene formula	397
Fruit, high colored	447	Kansas City, Ft. Scott and Mem-	
Fruits, crystalized or glace, Mrs.		phis R. R.	457
H. B. Monteith	287	Kansas City, St. Joseph and Coun-	
Fruits for the farmer, J. A. Ken-		cil Bluffs	459
nedy	146	Kansas City, Pittsburg and Gulf.	461

L		
Lady-Bird beetles versus San Jose Scale	404	
Last words	153	
Lawn, care of	409	
Lawns, making, C. Glover	73	
Laying out orchards	176	
Letters, G. B. Brackett, U. S. Pomologist	250	
J. P. Cowdin	226	
G. G. James	28	
A. Nelson	226	
Liquid air for refrigerator service	434	
London Purple	396	
M		
Manuring	384	
Membership	5	
Members, honorary	3	
Members, life	3	
Miscellaneous papers	333	
Mo. Botanical Garden, Prof. H. C. Irish	20	
Mock Orange, shrubs	417	
Missouri for fruit, L. A. Goodman	449-451	
Missouri Pacific Ry.	453	
Missouri, Kansas and Texas.	465	
Missouri State Hort. Society, work of, secretary	475	
Maps.		
Missouri Pacific	452	
St. Louis and San Francisco.	454	
St. Louis and Iron Mountain.	452	
K. C., Ft. Scott and Memphis.	456	
Atchison, Topeka and Santa Fe.	470	
Burlington Route	458	
K. C., Pittsburg and Gulf.	460	
Omaha, K. C. and Eastern, and St. Louis	462	
Missouri, Kansas and Texas.	464	
Wabash	466	
Chicago and Alton	468	
Santa Fe Route	470	
Chicago, Rock Island and Pacific.	472	
Chicago, Milwaukee and St. Paul.	474	
N		
Nasturtiums	167	
National Park of the south, proposed	426	
Necessary pride, Miss Lulu Wayman	233	
New fruits, report of committee on Nomenclature, report of committee on	261	
Nursery convention	428	
Nurseryman and Entomologist, Prof. J. S. Hunter.	430	
Nurserymen's Association, secretary's report	98	
Nursery stock, winter injury to, C. L. Watrous	429	
Nursery trees, root killing of, Prof. E. S. Goff	428	
O		
Officers, election of	279	
Officers, list	3	
Omaha Exposition, report of treasurer of Mo. Com., J. F. Davidson	268	
Orchard, dress and keep the, Conrad Hartzell	200	
Orchard manuring, E. P. Powell.	384	
Orcharding as a business, L. A. Goodman	347	
Orcharding, essentials of successful, J. T. Stanley	234	
Orchard management, W. T. Flournoy	317	
Orchards, discussion on	186	
Orchards, setting and care of trees, G. E. Adams	185	
Orchard trees, shaping of.	342	
Organize a Hort. Society, how to.	7	
Ornamental horticulture, James Ridgeway	407	
Ornamentals	407	
Ornamental stock	410	
Ornamental trees	68, 227	
Ornamental trees and plants, H. R. Wayman	323	
Ornamental plants	245	
Ornamentation of rural school and homes, Prof. J. C. Whitten	81	
Ornamenting school grounds, Prof. Whitten	436	
Ornamenting school grounds, James Newton Baskett	438	
Ornamenting school grounds, Prof. W. J. Stevens	440	
Out-door art	410	
Outlook, secretary's report	94	
Omaha, Kansas City and Eastern R. R.	463	
P		
Packing apples	446	
Pan-American Exposition	195	
Pansies	19, 166	
Paris Exposition, report on collecting fruit for the, W. G. Gano.	264	
Paris Exposition	250, 251, 272	
Paris Green	396	
Peach crop gleanings, U. S. Bulletin	358	
Peach culture, Roland Morrill.	362	
Peach growing, commercial, Wm. B. Hoag	63	
Peach, how I grow the, W. F. Benson	60	
Peach orchard, J. M. Russell.	362	

Peach trees	359	Recitation, "Pleasures of the Black-	
Peach trees, experience with frozen	361	berry," Philip McDonald	164
Peach trees, frozen	224	Refrigerator service, Liquid Air	
Peach trees, setting out	360	for	434
Peach trees, size, J. H. Hale	363	Report of secretary	92, 269
Pear blight, M. B. Wait	356	Report of treasurer	99, 277
Pear leaf blister mite	403	Report, our annual	273
Pear, nursery trees, W. H. Litson,		Resolutions, final	152, 327
Jr.	300	Resolutions on pure food	327
Pear, Garber and Keiffer, R. J.		Resolutions on Society's work ...	328
Bagby	299	Root rot of apple, Prof. von	
Pear, Psylla	401	Schrenck	225
Pears	355		
Petunias	167	S	
Planting between trees	353	San Jose Scale	404
Planting orchards	171, 176, 178	Sell or consign, A. H. Griesa	445
Plants, are pedigreed better, H.		Shaw banquet	436
Schnell	389	Sheep raising and orcharding, I. B.	
Plants, improvement by selection,		Lawton	129
H. J. Webber	387	Small fruits	371
Plants, twelve hardy Herbaceous,		Small fruits, best plan in distribu-	
N. O. Booth	245	tion of, G. T. Tippin	116
Plum Curculio	401	Small fruits, fall planting of, H.	
Plum orchards, opportunities for		C. Irish	381
wider planting, S. H. Linton ..	220	Small fruits, Random thoughts on,	
Plum, Satsuma, J. H. Hale	364	M. L. Bonham	43
Plums, commercial value of Japan	365	Small fruits, report on, G. W.	
Plum, varieties, discussion	222	Hopkins	263
Poems—A Day in June, Eben E.		Small fruits, when to cut back, H.	
Rexford	93	E. Van Deman	382
All About Apples	347	Southeast Mo. as a fruit growing	
Colorado Ben	340	section, M. Butterfield	281
My Grandfather's Orch-		Southeast Mo. and its resources,	
ard	346	T. B. Chandler	293
Orchard Lands of Long		Spray formulas	395
Ago, James Whitcomb Rile-		Spraying	317, 396
ley	355	Spraying, discussion on	289
Our Birds, H. W. Longfel-		Spraying, dry	315
low	340	Spraying for insects	396
Set Out Trees, Mrs. Annie		Spraying of orchards	396
G. Marshall	339	Spray pumps	314
The Fruit Tree's Prayer,		Stock for cherries	217
A. M. N.	337	Stone fruits, J. P. Cowdin	226
The Sunflower's Story.		Stone fruits	358
Velma C. Melville	417	Strawberries, Big, E. H. Grabill ..	377
When the Green Gits Back		Strawberries, cost of growing, B.	
in the Trees, J. W. Riley.	427	F. Smith	374
Poppies	168	Strawberries, discussion on distri-	
Preparation for orchard	170, 172, 175	bution of	42
		Strawberries, discussion on varie-	
Q		ties	31
Quality in preference to quantity.		Strawberries, Dry Weather	374
Geo. Raupp	28	Strawberries improved by selection,	
Quince growing	357	Prof. L. H. Bailey	372
Quince trees, pruning	357	Strawberries, quality in prefer-	
		ence to quantity, Geo. Raupp ..	28
R		Strawberries, the demand: the sup-	
Random thoughts on small fruits,		ply, G. A. Attwood	37
M. L. Bonham	43	Strawberries, varieties for market.	
Raspberries, Blackcap, N. F. Mur-		W. F. Rausch	27
ray	378	Strawberry, pedigreed plants, H.	
Raspberries, discussion on	45	Schnell	389
Reciprocity, L. A. Goodman	333	Summer meeting	14, 153

Sweet Peas	18, 165	United States Bulletins.....	103
Santa Fe R. R.	471	V	
St. Louis and San Francisco.....	455	Varieties of apples	179, 184
St. Louis and Omaha Branch.....	463	Varieties of cherries	209, 216
St. Louis and Iron Mountain.....	453	Varieties of plums	220
St. Louis and Keokuk Line.....	459	Varieties of strawberries	38, 43
T		Vineyard, E. W. Geer.....	371
Thinning fruit	386	Vineyard, planting and training.	
Tools	191, 193, 203	T. A. Peffer	306
Transportation, discussion on	122	Visitors at summer meeting.....	27
Treelessness, the curse of, C. W.		Visitors at winter meeting.....	169
Eliot	411	W	
Tree planting in our cities, L. A.		Water as a protection against	
Goodman	413	frosts, W. H. Jenkins.....	376
Tree root lice	402	Welcome response, Pres. Murray. 14.	158
Trees are short lived, why our.		Windbreaks	429
Prof. Whitten	324	Winter injury to fruits, G. W.	
Trees, care and management of		Hopkins	123
street, H. C. Irish.....	227	Winter meeting	157, 329
Trees, Catalpa and Maple.....	412	Wrappers, wooden veneer	125
Trees for street and lawn, decidu-		Wabash R. R.....	467
ous, J. M. Irvine.....	68	Y	
Trees, individuality of, Prof. G.		York Imperial	183
H. Powell	388	York Imperial, history of.....	353
Trees, individuality of our, L. A.		Yosemite Park	426
Goodman	275		
U			
Uniform packages, discussion on.	128		







L.A.

M68

1899



3 2044 029 582 004



